PD-BAE-423

635-0203

GAMBIA

MIXED FARMING + RESOURCE MANAGEMENT

Project Paper

FY 79

PART I of III

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT PAPER FACESHEET

1. TRANSACTION CODE: A (A = ADD, C = CHANGE, D = DELETE)

PP

2. DOCUMENT CODE: 3

3. COUNTRY/ENTITY: The Gambia

4. DOCUMENT REVISION NUMBER:

5. PROJECT NUMBER (7 digits): 635-0203

6. BUREAU/OFFICE: A. SYMBOL: AFR; B. CODE: 06

7. PROJECT TITLE (Maximum 40 characters): Gambia Mixed Farming and Resource Management

8. ESTIMATED FY OF PROJECT COMPLETION: FY 84

9. ESTIMATED DATE OF OBLIGATION: A. INITIAL FY 79; B. QUARTER 4 (Enter 1, 2, 3, or 4); C. FINAL FY 83

10. ESTIMATED COSTS ($000 OR EQUIVALENT $1 –)

A. FUNDING SOURCE	FIRST FY B. FX	FIRST FY C. L/C	FIRST FY D. TOTAL	LIFE OF PROJECT E. FX	LIFE OF PROJECT F. L/C	LIFE OF PROJECT G. TOTAL
AID APPROPRIATED TOTAL						
(GRANT)	(849)	(–)	(849)	(4,421)	(1,579)	(6,000)
(LOAN)	( )	( )	( )	( )	( )	( )
OTHER U.S. 1.						
OTHER U.S. 2.						
HOST COUNTRY		296	296		1,296	1,296
OTHER DONOR(S)						
TOTALS	849	296	1,145	4,421	2,875	7,296

11. PROPOSED BUDGET APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. GRANT	PRIMARY TECH. CODE D. LOAN	E. 1ST FY 79 F. GRANT	E. 1ST FY 79 G. LOAN	H. 2ND FY 80 I. GRANT	H. 2ND FY 80 J. LOAN	K. 3RD FY 81 L. GRANT	K. 3RD FY 81 M. LOAN
(1) SH	114B	078		849		1,750		2,030	
(2)									
(3)									
(4)									
TOTALS				849		1,750		2,030	

A. APPROPRIATION	N. 4TH FY 82 O. GRANT	N. 4TH FY 82 P. LOAN	Q. 5TH FY 83 R. GRANT	Q. 5TH FY 83 S. LOAN	LIFE OF PROJECT T. GRANT	LIFE OF PROJECT U. LOAN
(1)	684		687		6,000	
(2)						
(3)						
(4)						
TOTALS	684		687		6,000	

12. IN-DEPTH EVALUATION SCHEDULED: MM 01 YY 83

13. DATA CHANGE INDICATOR. WERE CHANGES MADE IN THE PID FACESHEET DATA, BLOCKS 12, 13, 14, OR 15 OR IN PRP FACESHEET DATA, BLOCK 12? IF YES, ATTACH CHANGED PID FACESHEET.

1 (1 = NO, 2 = YES)

14. ORIGINATING OFFICE CLEARANCE

SIGNATURE: Douglas P. Brown

TITLE: AID Operations Officer

DATE SIGNED: MM 10 DD 03 YY 78

15. DATE DOCUMENT RECEIVED IN AID/W, OR FOR AID/W DOCUMENTS, DATE OF DISTRIBUTION: MM DD YY

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2

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THE FOLLOWING ADDITIONAL ANNEXES ARE IN VOLUME II OF THE PROJECT PAPI

G.) DESCRIPTION OF THE STRUCTURE AND MANDATE OF THE IMPLEMENTING AGENCY

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J.) TECHNICAL ANALYSES OF PROJECT COMPONENTS

K.) SOCIAL SOUNDNESS ANALYSIS OF PROJECT COMPONENTS

L.) ECONOMIC ANALYSIS OF PROJECT COMPONENTS

M.) ADMINISTRATIVE ANALYSIS OF PROJECT COMPONENTS

N.) IMPLEMENTATION PLAN FOR THE PROJECT *

O.) FINANCIAL PLAN FOR THE PROJECT *

P.) PID and PID COMMENTARY *

Q.) PRELIMINARY INDICATION OF NEED FOR PEACE CORPS VOLUNTEERS *

R.) APPENDIX OF PRE-PROJECT RESEARCH PROPOSALS *

S.) BIBLIOGRAPHY *

Indicates that the annex was omitted from this printing.

The composition of the design team for the project paper was as follows:

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Mr. John Eriksen	Design Officer/Economist	REDSO/WA
Ms. Molly Halfon	Team Secretary	REDSO/WA

USEFUL ABBREVIATIONS AND ACRONYMS

ABEDA	Arab Bank For Economic Development In Africa.
ADB	African Development Bank.
AHPD	Department Of Animal Health And Production Of The MANR.
CILSS	Permanent Inter-State Committee On Drought Control In The Sahel.
CIDA	Canadian International Development Agency.
CFTC	Commonwealth Fund For Technical Cooperation.
CUSO	Canadian University Service Overseas.
DANIDA	Danish International Development Agency.
EAU	Extension Aids Unit Of The MANR.
ECA	United Nations Economic Commission For Africa.
ECOWAS	Economic Community Of West African States.
EEC	European Economic Community.
EDF	European Development Fund.
FAO	Food And Agriculture Organization Of The United Nations.
FRG	Federal Republic Of Germany.
FFHC	Freedom From Hunger Campaign.
GATT	General Agreement On Tariffs And Trade.
GCDB	Gambia Commercial And Development Bank.
GOTG	Government Of The Gambia.
GPMB	Gambia Produce Marketing Board.
GUC	Gambia Utilities Corporation.
IBRD	International Bank For Reconstruction And Development.
IDA	International Development Agency.
ILO	International Labor Organization.
IMF	International Monetary Fund.

ISF	Islamic Solidarity Fund.
ITC	International Trade Center.
ITU	International Telecommunication Union.
KDF	Kuwait Development Fund.
KFW	Kredientanstallt Fur Wiederaufban.
LMB	Gambia Livestock Marketing Board.
LOA	Livestock Owners Association In The Gambia.
LRD	Lower River Division Of The Gambia.
LRD/ODM	Land Resources Division Of Overseas Development Ministry.
MANR	Ministry Of Agriculture And Natural Resources Of The GOTG.
MEPID	Ministry Of Economic Planning And Industrial Development.
MID	MacCarthy Island Division Of The Gambia.
NBD	North Bank Division Of The Gambia.
OAU	Organization Of African Unity.
OCLALAV	Organisation Commune De Lutte Antiacridienne Et De Lutte Antiaviaire.
ODM	Overseas Development Ministry Of The United Kingdom.
OIC	Opportunities Industrial Center Of Philadelphia, Pennsylvania.
OPEC	Organization Of Petroleum Exporting Countries.
OSRO	Office Of Special Relief Operations.
PCC	Project Coordinating Committee Of The MANR.
PCV	Peace Corps Volunteer.
PPMU	Program Planning And Management Unit Of The MANR.
PRC	People's Republic Of China.
PS	Permanent Secretary Of A GOTG Ministry.
PWD	Public Works Department Of The GOTG.
RDP	Rural Development Project.
SCAAP	Special Commonwealth Assistance For Africa Plan.

SDF	Saudi Development Fund.
SESIMU	Socio-Economic Surveying, Implementation And Monitoring Unit Of RDP.
SIDA	Swedish International Development Agency.
SPLAJ	Socialist People's Libyan Arab Jamahiriya.
SWMU	USAID Soil And Water Management Unit.
UK	The United Kingdom.
UN	The United Nations.
UNCDF	United Nations Capital Development Fund.
UNCTAD	United Nations Conference On Trade And Development.
UNDP	United Nations Development Program.
UNESCO	United Nations Educational, Scientific And Cultural Organization.
UNFPA	United Nations Fund For Population Activities.
UNHCR	United Nations High Commission For Refugees.
UNICEF	United Nations Children's Fund.
UNIDO	United Nations Industrial Development Organization.
UN/OTC	United Nations Office For Technical Cooperation.
UNSO	United Nations Sahelian Office.
UNV	United Nations Volunteers.
URD	Upper River Division Of The Gambia.
USA	United States Of America.
USAID	United States Agency For International Development.
USSR	Union Of Soviet Socialist Republics.
VSO	Voluntary Services Overseas.
VTC	Vocational Training Center in Banjul, The Gambia.
WARDA	West African Rice Development Association.
WD	Western Division Of The Gambia.
YBK	Yoro Berri Kunda.

COUNTRY DATA -

AREA
11,295 km2

POPULATION
0.38 million (mid-1972)*

DENSITY
.. Per km2 of arable land

SOCIAL INDICATORS

	The Gambia 1960	The Gambia 1970	Reference Countries: Togo 1970	Senegal 1970	Syria** 1970
GNP PER CAPITA US$ (ATLAS BASIS) /1	..	140 /a	160 /a	260 /a	320 /a
DEMOGRAPHIC					
Crude birth rate (per thousand)	39 /k	43 /c	51 /c	46 /c	48 /c
Crude death rate (per thousand)	21 /k	23 /c	26 /c	23 /c	15 /c
Infant mortality rate (per thousand live births)	67 /b	..	..	156 /d	93 /e,f
Life expectancy at birth (years)	..	41 /c	40	41 /c	54
Gross reproduction rate /2	..	2.8 /c	3.3 /c	3.0 /c	3.5 /c
Population growth rate /3	1.6	2.0 /g	2.7 /g	2.1 /g	3.3 /g
Population growth rate - urban	3 /h	3 /h	6 /h	4 /i	5 /i
Age structure (percent)					
0-14	36 /k	41 /j	45 /m	42	49 /m
15-64	49 /k,n	55 /j	52 /m	54	47 /m
65 and over	13 /k,n	4 /j	3 /m	4	4 /m
Age dependency ratio /4	1.0 /k,n	0.8 /j	0.9 /m	0.9	1.1 /m
Economic dependency ratio /4	..	..	1.3	1.2	2.5
Urban population as percent of total	9 /h	14 /o,h	15 /h,l	29 /i	44 /o,i
Family planning: No. of acceptors cumulative (thous.)	..	..	..	..	..
No. of users (% of married women)	..	..	..	..	..
EMPLOYMENT					
Total labor force (thousands)	160 /m	230 /j,p	720 /md	1,700 /r	1,700 /m
Percentage employed in agriculture	76 /m	85 /p	76	73	54 /m
Percentage unemployed	..	..	..	7	5 /m
INCOME DISTRIBUTION					
Percent of national income received by highest 5%	..	..	..	..	..
Percent of national income received by highest 20%	..	..	..	..	..
Percent of national income received by lowest 20%	..	..	..	..	..
Percent of national income received by lowest 40%	..	..	..	..	..
DISTRIBUTION OF LAND OWNERSHIP					
% owned by top 10% of owners	..	..	..	..	..
% owned by smallest 10% of owners	..	..	..	..	..
HEALTH AND NUTRITION					
Population per physician	..	18,950 /s	22,470 /s	14,520 /s	3,660 /s
Population per nursing person	..	15,000 /s	3,390 /s	2,030 /s	3,920 /s
Population per hospital bed	650 /t,u	690 /u,v	660 /s,u	750 /s,u	1,090 /s
Per capita calorie supply as % of requirements /5	94 /w	100	94	97	102
Per capita protein supply, total (grams per day) /6	60 /w	63	51	64	70
Of which, animal and pulse	..	20 /x	19 /x	28 /x	16
Death rate 1-4 years /7	..	..	..	..	..
EDUCATION					
Adjusted /8 primary school enrollment ratio	15	32 /s	56	38 /d,y	88 /s
Adjusted /8 secondary school enrollment ratio	4	10 /s	7	15 /aa	39 /s
Years of schooling provided, first and second level	12	12	13	13	12 /s
Vocational enrollment as % of sec. school enrollment	1.4	3 /s	10	7 /s	4 /s
Adult literacy rate %	..	..	..	10 /ab,s	40 /ab
HOUSING					
Average No. of persons per room (urban)	..	..	..	..	..
Percent of occupied units without piped water	..	..	..	..	..
Access to electricity (as % of total population)	..	..	..	..	..
Percent of rural population connected to electricity	..	..	..	..	..
CONSUMPTION					
Radio receivers per 1000 population	6	157 /s	22 /s	/i	374 /s
Passenger cars per 1000 population	3	8 /s	5 /s	11 /i	5 /i
Electric power consumption (kwh p.c.)	20 /w	42 /s	43 /s	77 /s	183 /s
Newsprint consumption p.c. kg per year	..	..	..	0.1 /i	0.1 /i

Notes: Figures refer either to the latest periods or to the latest years. Latest periods refer in principle to the years 1956-60 or 1966-70; the latest years in principle to 1960 and 1970.

/1 The Per Capita GNP estimate is at market prices for years other than 1970, calculated by the same conversion technique as the 1972 World Bank Atlas.

/2 Average number of daughters per woman of reproductive age.

/3 Population growth rates are for the decades ending in 1960 and 1970.

/4 Ratio of population under 15 and 65 and over to population of ages 15-64 for age dependency ratio and to labor force of ages 15-64 for economic dependency ratio.

/5 FAO reference standards represent physiological requirements for normal activity and health, taking account of environmental temperature, body weights, and distribution by age and sex of national populations.

/6 Protein standards (requirements) for all countries as established by USDA Economic Research Service provide for a minimum allowance of 60 grams of total protein per day, and 20 grams of animal and pulse protein, of which 10 grams should be animal protein. These standards are somewhat lower than those of 75 grams of total protein and 23 grams of animal protein as an average for the world, proposed by FAO in the Third World Food Survey.

/7 Some studies have suggested that crude death rates of children ages 1 through 4 may be used as a first approximation index of malnutrition.

/8 Percentage enrolled of corresponding population of school age as defined for each country.

/a 1972; /b Bathurst only; /c 1965-70 UN estimate; /d 1968; /e 1971; /f AID estimate; /g 1960-72; /h Localities having been given the status of communes; /i Cape-Vert region and the cities of Saint Louis, Thiès, Kaolack, Diourbel and Ziguinchor; /j Cities, Mahafaza centers and Mantika centers; /k 1963; /l 1973; /m Estimate; /n 15-64 years; /o 65 years and over; /p Ratio of population under 15 and 65 and over to population 15-64 years; /q Estimate of active population in age group 14-60, based on 1973 Census; /r 1972-73 official estimate; /s 1969; /t 1966; /u Government hospital establishments and medical centers; /v 1966; /w 1961; /x 1964-66; /y Unadjusted; /z Including UNRWA schools; /aa Lower secondary level; /ab Definition not available; /ac 15 years and over; /ad Excludes unemployment.

* Estimated population [illegible] Census as 0.[illegible].

** Syria has been selected as [illegible] the country to be one of [illegible] substantial progress in the agricultural sector, [illegible]

BEST AVAILABLE DOCUMENT

GAMBIA MIXED FARMING AND RESOURCE MANAGEMENT PROJECT

535 - 0203)

II. DESCRIPTION OF PROJECT

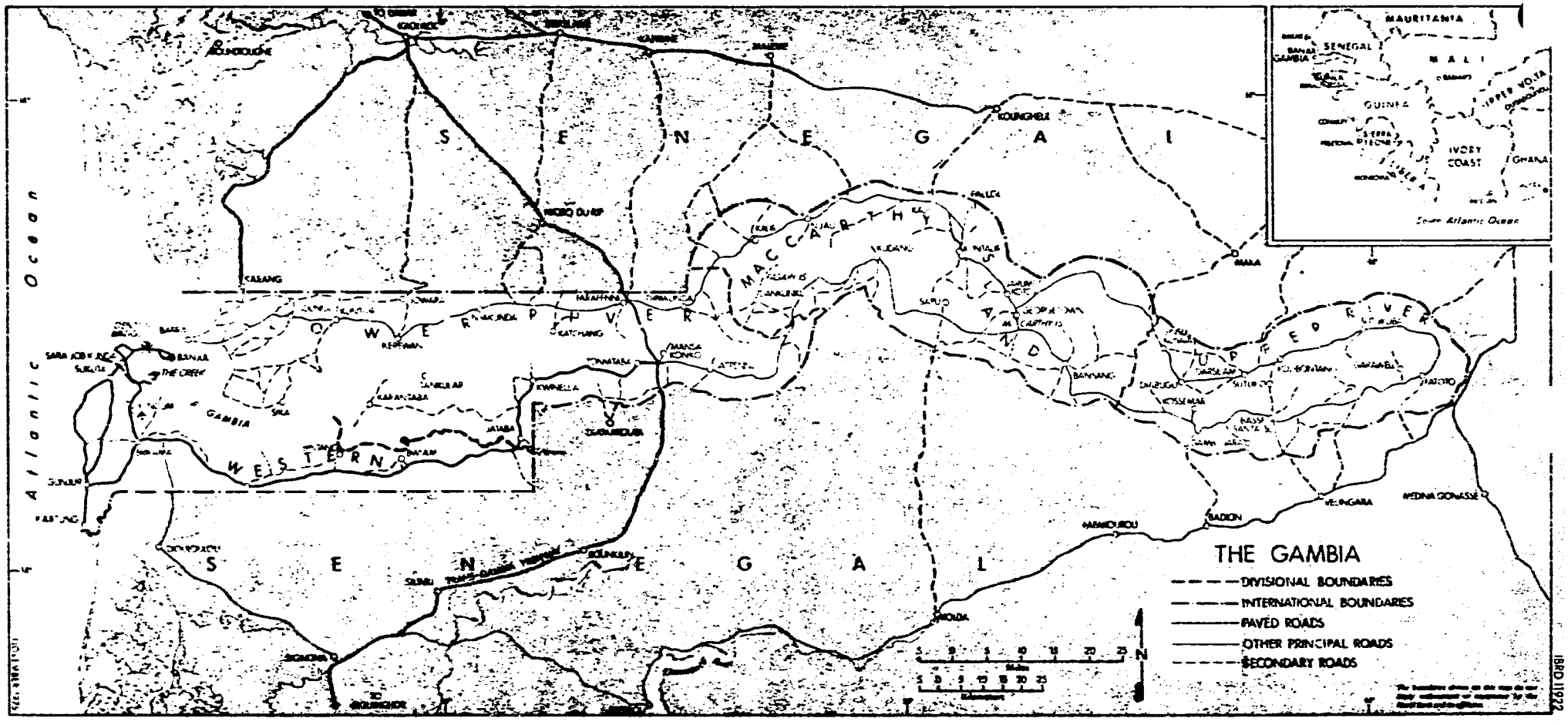
A. Summary of the Problems

The Republic of The Gambia is one of the smallest coutries in Africa being some 250 miles in length and 15 to 30 miles in width. It is surrounded on three sides by the Republic of Senegal. Agriculture - defined as crop husbandry, animal husbandry and fishing - is the most important economic activity in the country. It accounts for over 60 percent of gross domestic product, provides a livelihood for more than four-fifths of the population, contributes more than 95 percent to export earnings, and forms the basis for the principal processing industries. Agriculture in The Gambia is largely rainfed crop husbandry and traditional livestock raising. Irrigated agriculture is practiced only on a small area. Land under annual cultivation is estimated at approximately 400,000 acres with additional landholdings in fallow, woodland, and permanent grazing areas. Farm enterprises are carried out on small holdings by family units normally averaging 12 persons. These farming units (dabadas) pool their labor and resources and divide the work tasks between men and women. In addition, migrant labor--the so-called "strange farmers" --enter the rural work force on a temporary basis under direct payment or crop-sharing arrangements. Finally, agriculture labor is not differentiated into crop and livestock specialization. Most farm units in the country maintain both crop and livestock enterprise combinations within the same farming system.

Besides groundnuts, which are by far the most important cash crop, there are other minor cash crops, including palm kernals and cotton. Rice, millet and sorghum are the traditional food crops, which are mostly consumed on the farm. Maize is overall a minor crop, but it is very important in certain upriver areas and among certain tribal groups. There has developed historically in The Gambia a pattern of heavy economic dependence on the annual groundnut production as the major cash crop. At the same time, traditional production of food crops is not sufficient to meet domestic consumption, entailing continued reliance on food imports--chiefly rice--which represent on the average nearly one-third of annual consumption requirements. Similarly, farm enterprise development involving livestock has been neglected in proportion to its potential economic value for the total farming system.

In the present Five Year Development Plan for the period 1976-1980, the Government of The Gambia (GOTG) has taken cognizance of the economy's structural weaknesses and vulnerability posed by the heavy dependence on a single primary crop. The central thrust of the Plan is toward intensified development of the rural sector and, particularly, toward increased diversification of agricultural production and better management of rural resources.

Underlying problems which must be dealt with effectively if the Gambian agricultural system is to develop to the greater benefit of the rural population can be grouped in four categories:


THE GAMBIA
DIVISIONAL BOUNDARIES
INTERNATIONAL BOUNDARIES
PAVED ROADS
OTHER PRINCIPAL ROADS
SECONDARY ROADS
SENEGAL
MACCARTHY ISLAND
UPPER RIVER
WESTERN
Atlantic Ocean
MAURITANIA
MALI
GUINEA
IVORY COAST
GHANA
South Atlantic Ocean
IBRD 11922

1. Problems related to the growing population pressures--both human and animal--on a limited land resource base in a harsh ecological zone.

2. Problems related to the low productivity of traditional crop and livestock enterprises within the farming system.

3. Problems related to the lack of adequate rural infrastructure to support a modern, intensive system of agricultural production.

4. Problems related to the low level of general education and, particularly, the very limited exposure to modern agricultural technology among the rural population of The Gambia.

These underlying problems pose serious dilemmas for the rural population of The Gambia and for the Government in seeking to address the issues of environmental damage from overgrazing and indiscriminate devegetation, soil depletion, and the general loss of productivity inherent in the current agricultural system of the country. Increasing population has placed additional pressures on the land and water resource base. These pressures result in more acres cleared, more livestock grazing, and more cutting of wood. Efforts to extend traditional crop and livestock enterprises simply by increasing land surface to provide a minimal standard of living for a population increasing at a rate of 2.8 percent per annum lead inexorably to greater conflicts among farm enterprises E.G., dry season cultivation of rice versus utilization of these areas for forage reserves for livestock, shortening of fallow periods and longer continuous planting of soil-depleting crops, using of scarce agricultural resources on even more marginal croplands, and excessive removal of the forest cover. Resource degradation is the direct result of these greater land pressures. Similarly, intensification of agricultural production is difficult due to a lack of adequate development resources and proven adapted technologies. The situation is particularly bad on land that is not under annual cultivation of crops because external donor agencies have tended to concentrate their attention and available resources wholly on existing cropland while neglecting the equally important problem of the management of fallow and non-crop lands. This situation has resulted in a non-integrated approach to rural resource management and is the primary reason for the interventions proposed in this project.

For longer and more detailed descriptions and analyses of The Gambian economy by sectors, the reader is referred to the Aid/Gambia Development Assistance Paper of November 1976 and to Annex G. of this paper entitled "The Agricultural Sector of The Gambian Economy and Government Policies for Rural Development in The Gambia", and the Gambia CDSS of 1978.

B. Relation of the Proposed Project to Country Development Strategy and Host Country Priorities

Given the nature of its economy and geographical location, the Government of The Gambia recognizes that it must make every effort to

maximize its opportunites and manage its resources to develop the rural sector. The Government's first significant movement away from almost total dependence on British assistance in agriculture was the formulation of the four-year $11.7 million Rural Development Project (RDP) in collaboration with the IBRD/IDA, the British Ministry for Overseas Development, and the Arab Bank for Economic Development in Africa.

This project, which is now in the third year of implementation, focuses on agricultural development with major components in agricultural extension and training, cooperatives development, agricultural production credit, seed multiplication, crop extraction roads, and adult numeracy. The RDP is oriented toward crop husbandry at the farm level and complementary extension support services within the Department of Agriculture in Ministry of Agriculture and Natural Resources (MANR). Primary crop emphasis is on technological crop packages, variety screening, and seed multiplication for rainfed foodgrains: rice, sorghum, and millet. Groundnuts are included as the primary cash crop.

The IBRD/IDA has recently undertaken exploratory discussions with the GOTG on the content for the expanded Phase II RDP to begin in 1980. This exercise has helped the Gambian Government to focus its thinking on the optimal future husbanding of external donor assistance in the rural sector. Under Phase II RDP geographic expansion is envisaged to encompass the eastern half of The Gambia instead of concentrating efforts only in the western Divisions as under Phase I. Actual programmatic content for this second phase is still under consideration, but certain broad donor guidelines are already clear in Ministry discussions. These are as follows:

1. The IBRD/IDA assistance will continue to be concentrated on rainfed foodgrains, and groundnuts, and irrigated rice variety screening.

2. The People's Republic of China will give assistance in irrigated rice extension.

3. The EEC/EDF will direct its contributions toward expansion of production credit for crop packages and overseas training of Gambian personnel.

4. The UNDP and FAO agencies will assist in bolstering local agricultural planning capacity, including marketing.

5. The African Development Bank will continue its efforts to promote cotton as an alternative cash crop.

Various Arab fund sources have allocated funds for reconstruction and upgrading of the primary roads for the length of the country on both the north and south banks of the Gambia River. Kuwait is funding an integrated transportation study to rationalize the utilization of river transport with the new road network. (See Annex I.)

In addition to the above, and in consonance with the GOTG's expressed wish that AID concentrate its expertise on integrated rural resource

management, AID has embarked upon a project to establish a Soil and Water Management Unit within MANR. Regional and Gambia-specific crop protection activities are moving forward with AID and FAO assistance under the auspices of CILSS. AID is currently examining the feasibility of assistance in revegetion/reforestation in conjunction with other donors through CILSS and the Club du Sahel.

With this backdrop of other donor assistance to the rural sector of The Gambia and in considering the likely components of the expanded RDP, tripartite discussions involving GOTG officials, representatives of the IBRD, and AID staff members isolated one major area of concern which was not being adequately covered by any donor. The area was integrated resource management on fallow and non-cropland with appropriate livestock and forestry elements. Discussions furthered revealed to all parties:

A). Recognition that the mixed farming nature of Gambian agriculture necessitates efforts to develop both crop and non-crop enterprises at the farmer level;

B). Recognition that preliminary estimates of IBRD/IDA funding availabilities for Phase II RDP do not permit extensive involvement in non-crop related development activities.

It is clear from discussions with the GOTG that in the general field of agriculture, the MANR has determined that its two highest priorities under the CILSS first generation program focus upon halting environmental degradation and improving the renewable resource base. AID's concentration on mixed farming systems, soil and water management, and revegetation meet these priorities squarely.

These general program conclusions are directly in line with the results of concurrent internal discussions among AID/Washington, REDSO/WA, and AID/Banjul on development strategy for The Gambia. The Development Assistance Paper (DAP), which was prepared in November 1976, and the series of program guidance cables that AID/W has issued since that time all identify resource management activities as an area of prime concern. The final design for the Soil and Water Management Project for The Gambia was completed in 1977. AID/Washington subsequently has indicated a strong interest in receiving for consideration preliminary project documents for complementary efforts in mixed farming and resource management and in forestry. The resultant PID was presented as a response in the former area of concern in February 1978 and approved by AID/W on 21 April 1978, as per the documents in Annex F. This Project Paper completes the design process for the Project.

C. <u>The Purpose to be achieved in this Project</u>

The goal of this Project is to increase the economic well-being of the rural people of The Gambia. The purpose of the project is to foster intensification and integration of crop and livestock enterprises within existing Gambian farming systems so as to contribute to increasing net rural family incomes on an ecologically sound and sustained yield basis.

D. Project Components (Inputs)

The principal agency in the design and for the implementation of this project is the Ministry of Agriculture and Natural Resources. Within the Ministry, the Departments of Agriculture, Forestry, Cooperation, Animal Health and Production, Hydrometeorological Services and the Soil and Water Management Unit have participated in the formulation of and will implement the project components listed below under the coordinating authority of the Office of the Minister in the person of the Permanent Secretary. The two principal vehicles for planning and coordination of project activities will be the Program Planning and Management Unit and the Project Coordinating Committee. The former is the unit within the Ministry charged with overall rural development planning. The latter is a permanent committee, chaired by the Permanent Secretary, which coordinates all in-country activities of external donor agencies having programs in agriculture and rural development.

The project is formulated as an initial five-year effort to run from FY 1979 through FY 1983, with a second phase to be designed during the implementation of the first phase of the project.

The components of the project are discussed below under six separate sub-headings. It should be recognized at the outset, however, that these components are not discrete packages unto themselves but highly interrelated and mutually supportive actions upon whose joint success depend the benefits of the project.

The essence of the project as outlined in the following several pages and detailed in the Annexes is that The Gambia is faced with a whole series of difficult and complicated choices in the development of its agricultural sector. In the areas that have been isolated for assistance by AID, the range of choice in technology and complexity in problem-solving is perhaps greater than in any other area of development if only because the areas have been neglected in the past and therefore one is starting from a less well-defined base for field work. Faced with this situation, the design team quickly reached a consensus that the project activities flowing from this project would have to be more developmental in focus than oriented toward extensive promotion and implementation of known and proven technologies. While there is surely a basis in known technologies from elsewhere for starting work in The Gambia, there is not as yet a defined and proven series of technological packages in all the areas under consideration in this project. The preferred method of dealing with this situation is, in the opinion of the design team members, by devising and field testing the needed technological packages in interdisciplinary interaction with team members from a number of related or complementary disciplines. The reader is therefore cautioned in reading the following abbreviated descriptions of the project components not to forget that the core of AID assistance in the project is the multi-disciplinary team of five long-term specialists who will interact and critique on all component activites. The end point of each component therefore is a technological package and a series of interventions which relate to the other components of the project and have been specifically devised, tailored and adapted by the team to meet Gambian farming conditions through an organized and disciplined research and testing process.

1. Land Resource and Use Evaluation, Classification and Cartography

The Gambia, being a small country with a relatively high human (280 per sq. mile of arable land) and animal population density per square mile, is increasingly faced with problems of conflict over land untilization. These conflicts are particularly acute between crop and livestock enterprises. in the farming system as farmers attempt to increase the area of land used for foodgrain and cash crop production under extensive cultivation methods at the same time they attempt to increase their holdings of animals, which rely heavily on the same land for extensive grazing. As unplanned and unregulated cropping of new areas proceeds apace with growing livestock populations and unmanaged grazing, fallow periods are reduced, ever more marginal land is brought under the plow, and the total land resource deteriorates. Intensification of both agricultural and livestock enterprises on defined units of land is difficult due to the low productivity of present farming practices.

The situation obviously calls for increased governmental and community effort in the area of resource planning and, in its broadest sense, conservation. This effort is hindered, however, by the fact that no detailed evaluation of Gambian land resources and use patterns has ever resulted in readily-available, large-scale land classification cartography that is so essential for effective land use planning.

The first component of the project, therefore, is designed to remedy this situation by assisting the Government to obtain and utilize detailed large-scale (1:25,000) land classification maps for each of the five administrative divisions of the country. The land use mapping will be done by contract with a U.S. Photo Interpretation cartography firm. Maps will be made from aerial photos flown in December 1979 - January 1980 using high resolution photography at a contact print scale of 1:25,000. The land use maps will identify the three precipitation zones that influence vegetation types, soil formation and, to some extent, existing cultivation patterns. The maps will follow the general land use classification detailed on Page 2 of Project Component #1 of Annex J. . The mapping will also include delineation of existing land uses, villages, trail and road systems, other standard features and political boundaries normally provided on base maps as specified by the GOTG.

A cadre of Gambian recource planning technicians capable of using and interpreting aerial photos will be trained over the course of the project. The initial training and development of training materials similar to the USDA Soil Conservation Service Training Manual but directly relevant to The Gambia will be done by outside consultancy. This training will include aerial photo interpretation, simple mapping procedures, care and storage and development of overlay maps. Once the initial training materials are developed, all subsequent training will be done from within the Ministry of Agriculture and Natural Resources by trained local personnel.

Implementation of this component will require U.S. contractual assistance for both the aerial photography and the photo interpretation, cartography and training of local technicians. Estimated cost of this component is US $ 849,000. It is expected that all contractual activities under this component will be completed within two years from the signing of the necessary contracts.

2. Grazing Areas Development and Management

Traditional grazing areas in The Gambia can be divided into two distinct categories:

A.) Cultivated land that is usually grazed by small and large ruminants after crops are harvested; and,

B.) Fallowland, range and woodland that are available for grazing whenever forage availabilities permit.

The national herd is increasing and placing more and more grazing pressure on these lands. Traditional methods of grazing management and other manipulations of the land have established a chronic set of resource deterioration problems. The solution - or, at least, a start toward a solution - must use an inter-disciplinary approach for development of appropriate technology that can be provided to livestock owners and that will result in protection of the resource base and maintenance of the national herd at a productive level.

The major problems identified as constraints to an improved grazing and resource management system in The Gambia are the lack of quality forage in sufficient quantity to meet maintenance and growth requirements of large and small ruminants on a year-long basis; and the lack of sufficient basic field data to develop and implement effective grazing management plans with the existing livestock owners associations and other cooperating groups.

The purpose of this component, therefore, is to provide necessary support to the GOTG in the development and management of controlled grazing areas designed to improve the nutritive status of large and small ruminants using them, and bring animal units in balance with the natural resource base of the country. It will also produce this basic data necessary for the GOTG to develop national resource management and land use policies. It will provide the beginning for improvement of the national natural resource base and maintenance of that base at a level capable of sustaining needs of the resource users.

Using the results that will flow from the preceding project component and in active collaboration with project technicians suppli under subsequent components, it is envisaged that this component will:

a. Provide assistance to the Government of The Gambia in developing a national land use planning capacity withi the MANR which can relate to the problems of both crop-land utilization and non-cropland.

b. Provide assistance in training specialized agents at all levels in grazing areas development and management.

c. Provide assistance to the Department of Animal Health and Production in planning and implementing a program of legislated, controlled grazing areas with the necessary stock access routes, watering points, firebreaks, forestry shelter belts, and stock-handling facilities.

With regard to the development of a national land use planni capacity, an excellent start is being made through the formation with AID assistance of a Soil and Water Management Unit within the MANR. T project proposes to build upon and support that Unit by supplying to t Ministry such technical assistance as will be necessary to formulate a implement an overall national land use plan. Particular attention in this project will be given to the management of fallow and non-cropland.

The component also proposes to build upon the existing GOTG program for physical demarcation of livestock trails and grazing areas which was started in 1976 as a precursory step to improved range management planning at the village level.

Under this component, AID will supply to the MANR a professional with training and experience in plant ecology, range management and renewa natural resource planning. Over the life of the project, the specialist will direct a team of 6 - 8 Gambian Technicians who are already in training in the United States and Kenya, in an intensive program which will include:

A.) Acceleration of the existing program of physical demarcation of livestock trails and grazing areas;

B.) Use of the cartography provided under component #1 to classif and evaluate all such demarcated areas;

C.) Studies of range vegetative cover composition, condition and resultant carrying capacities within the demarcated village grazing areas;

D.) Compiliation and evaluation of a national livestock water use plan.

E.) A series of grazing land management and production trials in collaboration with the Project's Forage Agronomist.

F.) Work with the Department of Forestry in grazing trials on designated woodland areas and forest parks to introduce and evaluate browse species suitable for livestock use and subsequent firewood supply.

G.) Controlled burning experiments to determine the immediate and long-term effects of this practice on Gambian range land.

H.) Development of the required data base for year-round forage resource planning and range management schemes with selected livestock owners associations.

I.) Provision of specialist expertise to MANR efforts in national natural resource planning and policy formulation

A more detailed presentation of the program envisaged under this component can be found in Annex J., Section II. Total AID funding under component is US $766,000.

3. Improved Crop and Forage Production and Management

This component of the project concerns itself with both improved systems for forage production and improved technologies for maize production.

The objectives of the forage program are to:

1. Increase livestock feed supply to complement the range management component by developing an improved forage production and management program.

a.) Survey existing information and materials about improved forage species in The Gambia.

b.) Introduce and evaluate exotic tropical grass and legume species and cultivars.

2. Demonstrate the potential of extending dry season grazing by introducing a forage legume into the fallow and utilizing groundnut hay more effectively.

3. Establish observational trials under grazing in certain regions of the country in collaboration with the Range Management Specialist.

4. Increase seed supplies of suitable and adaptable grass and legume species and collaborate with the Ministry Seed Multiplication Officer in developing a seed production program.

5. Improve the capability of the Ministry personnel in delivery of improved technology in forage production to livestock owners.

Maize holds considerable residual potential as a animal feedstuff for the project in The Gambia if used either as grain for feed rations or stover as a feed residue. It is most important as a human food in upriver areas of the country, being roasted on the cob in an immature stage and occasionally cooked as mature grain and this is expected to continue as the primary consumption pattern. However, maize will also have an assured commercial outlet as a feed grain with the installation of a second commercial feed mill to be operated by the Gambia Produce Marketing Board for livestock feed. The Ministry inaugurated a cereal improvemant program in 1973 using technological package programs in an effort to increase yields of maize, millets, sorghum and rice for food production. This project proposes to intervene in this component to increase the production of maize as a crop for both human and livestock consumption.

The objectives of this project component are to:

1. Increase production of maize as grain by developing a technological package of improved production practices and integrate the improved maize technology into the on-going program for increased cereal production.

2. Collaborate with local agronomists in maize cultivar testing and agronomic programs.

3. Collaborate with the Ministry Seed Mutliplication Officer in seed increase programs of suitable and high yielding maize cultivars.

Demonstrate the potential of maize as a feed grain and residual feedstuff by assisting in the training of extension personnel and demonstrators in delivery of the developed technological package to farmers.

Complete details for both of the above programs can be found in Annex J., Section III. to which the reader is referred. Major AID assistance in this component will be used to provide two Agronomists with tropical experience specialized in forage production and maize technology respectively. The forage agronomist will be with the project over its entire life while the maize agronomist is expected to assist in program development for three years. The total cost of this component is US $ 1,249,400.

4. Improved Rural Technology

Although The Gambia is a small country, a serious deterrent to its agriculture functioning efficiently is the absence of reliable means of transport on farms and from farms to marketing points. The human energy required to seek firewood, water, and transport goods and crops by hand is often a serious drain on total energy available for planting, weeding, and harvest of crops and other non-crop farm activities. Delays in arrival of crops at marketing points because of waiting for transport often result in loss of quality in groundnuts and other crops offered for sale. Much of the available crop residues could be more effectively utilized for feeding small ruminants and cattle during the dry season if the residues could be brought to the compounds for protection from trampling and destruction by wandering herds of livestock and exposure to the elements.

Animal traction equipment for direct cropping activities does enhance total crop production and aid in reduction of peak labor needs. Likewise, animal power for farm transport of agricultural inputs and outputs improves farm efficiency. The IBRD/RDP already has an effective program for the use of credit to purchase animal traction equipment and also to a more limited extent loans for the purchase of two-wheel farm carts. During Phase I of the RDP project, farmer demand for animal-drawn farm carts far exceeded the anticipated level, thus credit funds were readily used up. As pointed out in Annex H., Section B., the desire for farm carts was a high priority at the Livestock Owners Association meetings attended by design team members. Therefore, in consultations with IBRD personnel in Banjul, it was decided that both the RDP and this project would be best served if we divided responsibilities for animal traction programs with the RDP concentrating on equipment directly related to cropping activities and AID on the farm cart element.

Given the above, the objectives of this component are to:

1 Establish a revolving fund for use as commodity credit to expand resources on farms through:

A. Integrated use of farm cart transport in mixed

farming systems.

B. Collaboration with the Gambian Cooperative Union in the use of commodity credit.

2. Demonstrate that use of the "modified farm cart" can be effectively used to improve efficiency of farm operations.

3. Develop technology for improved livestock methods by using the farm carts to aid in:

   A. Establishment of compound units for storage of crop residues.

   B. Collaboration with the Animal Nutritionist in devising systems of storage for the crop residue which most effectively maintain and/or improve their nutritive value for livestock.

4. Improve the capacity of the Departments of Animal Health and Production and Agriculture to provide improved technology on the value of improved feeding in animal production, through training of Assistants and Inspectors in efficient use of mixed farm resources for animal and crop production.

5. Demonstrate to Livestock Owners Association members improved methods for the use of their on-farm resources through conducting on-farm demonstrations in crop residue and forage preservation and in the management and utilization of manure in crop production particularly on compound crops like maize.

AID assistance in this compound is oriented to provision of short-term technical assistance, supervision of Peace Corps Volunteers and Gambian technicians by the long-term AID specialist team, and provision of a revolving fund for distribution of approximately 400 farm carts per year over the life of the project. Total cost of the component is US $ 293,000.

5. STRENGTHENING MINISTRY PLANNING AND EVALUATION CAPACITY

1. INTRODUCTION

A farming system is the end result of a complex interaction between a number of interdependent components. In order to achieve it, an individual farmer, having access to certain specified quantities and qualities of the four factors of production (i.e., land, labor, capital and management), allocates them to three processes (i.e.,crop, livestock and off-farm enterprises) in a manner which, within the knowledge he possesses, will optimize the attainment of the objectives toward which he is striving.

The types of, and physical potential of, livestock and crop enterprises will be determined by the technical element which reflects what the potential farming system can be and therefore provides the necessary condition for its presence. Constituents of the technical element include physical and biological factors which have been modified to some extent by man often as a result of technology development.

The farming system that actually evolves, however, is a subset of what is potentially possible as defined by the technical element. The determinant of the actual farming system is the human element which in effect provides the sufficient condition for the presence of a particular farming system. The human element can be subdivided into:

A. Exogenous Factors

This includes the social environment and other factors that are largely outside the control of the individual farmer but that will influence what he will and/or is able to do. Simplistically, these can be divided into at least four broad groups: community structures, norms, and beliefs; local institutions operating independent of external influences; external institutions or those usually supported directly or indirectly by developmental agencies (e.g., extension inputs, credit programs, input distribution systems, product marketing programs, etc.); and miscellaneous influences, such as population density, size and location of village, and the like.

B. Endogenous Factors

These include the individual decision maker and those other factors that are under his control. He is the person who ultimately decides on the farming system that will be found, being influenced and sometimes constrained by the technical element and exogenous factors.

This brief introduction serves to place in perspective the complexity involved in implementing the proposed Gambia Mixed Farming and Resource Management project and, hopefully, the holistic and integrative role to be played by the socio-economic unit in strengthenin project and ministry planning and evaluation capacity.

The observations presented in this paper represent 11 days of work in The Gambia. It was not possible, therefore, to deal in detail with all the aspects that would have been desirable. The observations are based on reading, 1/ meetings with officials in MANR and other ministries, talks with individual farmers and Livestock Owner Associatio (LOA) members, field visits with RDP personnel and discussions with othe team members.

II. THE GAMBIAN SITUATION

There is no question that there is genuine commitment on the part of the Gambian Government to improving the welfare of the farmer having livestock enterprises in his farming system. The uncertainty develops with respect to the unknowns in the "total" (i.e., technical and human) environment that exist with respect to the farming system, which contains livestock enterprises. These unknowns can be summarized as follows:

(a) Little is known about the traditional livestock production enterprises in The Gambia, for example, concerning herd management and structure, feeding regimes, inputs devoted to and products and incomes derived from livestock, decision making as it relates to livestock, etc. There are a number of conventional wisdom statements about some aspects of the above but virtually none have been subjected to rigorous empirical testing. Lack of information at the traditional level encompasses technical, social and economic matters and therefore includes knowledge on both the technical and human elements.

(b) Work undertaken by technical scientists in establishing the physical potential on improved systems is virtually non-existent 2/ (e.g., improved range management, improved animal nutrition, improving use of crop residues). Without a substantial core of basic knowledge about improved systems from the technical point of view, it is impossible to fully implement a development program with respect to livestock producers.

1/ From a socio-economic viewpoint, work undertaken by G.Lowe, the ODM/ Land Resources Division, M.Haswell, P.Weil and the Rural Development Project (RDP) proved to be of particular value.

2/ This is meant to apply to production aspects and not disease eradication where considerable success has been achieved. With reference to the latter,however, one area that is proving to be particularly difficult to achieve a substantial breakthrough in is with respect to trypanosomiasis.

(c) While there appears to have been a technical assessment of the availability of some of the programs related to livestock that are currently being implemented on a small scale, or about to be (e.g., maize cultivation, cattle fattening program, farm carts), there is little information from an economic or social point of view as to whether they are compatible with other parts of the existing farming system. This is particularly related to the endogenous factor component of the environment.

(d) Little information is available on some of the components that can be classified as exogenous factors. For example, almost nothing is known on the possible negative and/or positive effects of the marketing system and Livestock Owner Associations in commercializing the livestock industry.

The serious implications concerning these unknowns is further enhanced by the following problems:

(a) The problem of increasing population density with a concomitment increase in the livestock population is increasingly bringing into conflict the multiple uses of land for crops, livestock and forest. The problem in one sense is exacerbated in The Gambia, since unlike many other Sahelian countries where much of the livestock are still herded under nomadic and transhumant systems, the livestock are owned by the villagers themselves and feed for them has to be derived from within the village areas. Thus the conflict is largely internalized within villages. As a result it is possible that, if nothing is done, serious inequities could develop in the long run in such situations characterized by a diminishing area of common pasture land, a hierarchical though not at present oppressive village structure and a herd distribution whose size tends sometimes to be correlated with that hierarchy. It is reasonable to argue that it should be possible to avoid such an eventuality arising from the increasingly competitive relationship between livestock and crops. It is hoped that the proposed project will, by developing and implementing improved intensified production enterprises for livestock within modified farming systems, be able to re-establish the traditional complementary relationships that have existed between crops and livestock.

(b) The unknowns mentioned above contain constituents that cross discipline boundaries. This implies the absolute necessity of a multidisciplinary team working in an interdisciplinary setting. Unfortunately to date such teams operating in the area of farming systems that include livestock enterprises have not often been found. As a result, no well defined methodological approach exists. The proposed project with its livestock elements could therefore make a unique contribution in this area.

In summary, it would appear that the proposed Mixed Farming and Natural Resource Management project is urgently needed in The Gambia to provide continued diversification of the economy, traditionally so dependent on groundnuts, and to develop and implement improved systems for the farmer with livestock enterprises. However, the current situation in The Gambia means that much of the project work will have to have a developmental rather than simply an extension implementation focus.

III. PURPOSE

The basic purposes of the socio-economic unit optimally would appear to be to bridge the gaps between the components and disciplines represented in the project and to increase the efficiency of the developmental and implementation foci of the project, consistent with the over-riding goal of improving the economic well-being of rural people in The Gambia.

It is therefore reasonable to suggest that the socio-economic unit will play both an integrative as well as a service role and will tend to have a farm-level, micro-orientation.

More specifically, it is envisioned that the socio-economic unit should have the following functions:

A. Descriptive Function.

This would provide information of a quantitative and qualitative nature describing and analyzing the livestock and land use systems operating in The Gambia with the purpose of providing:

1. Information that will authoritatively delineate the characteristics of the land use systems and the constraints faced by livestock producers, from which it will be possible to develop relevant research priorities and/or implementation strategies.

2. Information relevant to the specific needs of the technical scientists which is required in the execution of their research programs.

3. As a result of the initial work, a backdrop against which the project can be monitored and evaluated during and after its execution.

B. Testing Function.

This function can be subdivided into:

1. Involving testing of the field level the particular technological packages developed by the project, in order to assess their relevancy to the local Gambian farmer. In effect these packages would be assessed in terms of their compatibility with the technical element, and endogenous and exogenous factors.

2. A less tangible form of testing would be looking at the potential of the "institutions" or exogenous factors serving the livestock producers to provide the neessary incentive and support to increase their level of economic well-being and to ensure an equitable distribution of that improved well-being.

The purpose of these two types of testing would be to ensure as far as possible an objective judgment of the potential value interventions based on them. Unsatisfactory results to the test would necessitate further work in making them more appropriate prior to the considerable commitment of resources required in implementation.

C. Monitoring Function.

This would involve monitoring changes over time as a result of project interventions. The purpose of this would be to:

1. Ascertain if the packages and/or strategies are proceeding as anticipated or whether some modification is necessary.

2. To assess the impact of the project and therefore provide a base for its evaluation.

D. Training Function.

The purpose of this would be to build up a core of Gambians with a micro socio-economic orientation in the Ministry of Agriculture and Natural Resources. An important aspect of the proposed project is that it would provide a unique opportunity for Gambians to receive practical experience in this area. Training would be provided at both the senior and junior levels.

The above brief description of this component lays out the rationale and structure of the work to be done by the project socio-economic unit. For fuller details of AID inputs into this component, a description work plan for the unit over the life-of-the-project, and a complete listing of the studies to be undertaken, the reader is referred to Annex J., Component # 5. Total cost for this component is US $1,447,000.

6. AGRICULTURAL SKILLS TRAINING AND COMMUNICATIONS

This final component of the project is essentially a support activity for the components that have been described earlier. The lengthy report in Annex J., Component # 6 breaks the activities down into sections on training support and communications support.

The purposes of the training support sub-component are:

1. To make good use of Gambians who have already received training in animal health, animal husbandry, and related subjects.

2. To provide better pre-service and expanded in-service training opportunities for Agricultural and Livestock Officers, Assistants and Inspectors.

3. To train a core of Livestock Officers to take over the management of the basic components of the project.

4. To restructure the syllabus of Agricultural and Livestock Assistant and Livestock Inspector training.

5. To provide a multidisciplinary focus in improved pre-servi instruction.

6. To increase training opportunities for ox farmers, livestock owners, and contract herders.

7. To foster increased coordination in establishment of training objectives and policies among the Departments of the Ministry.

8. To assure a close association between the communications support services of the Extension Aids Unit and the training activities of the Departments.

The inputs and outputs for this component are summarized in the following table.

TABLE I : TRAINING SUPPORT INPUTS AND OUTPUTS

Input	Output
1. Ten Gambian trainees from middle or high level staff candidates who will go abroad for training.	1. Ten trained Gambians who will reinforce Ministry staff an support project objectives.
2. Twenty Gambian trainees from lower level staff, whose training will be organized in The Gambia.	2. Twenty trained Gambian manual laborers or machine operators who will help provide sound infrastructure for project.
4. Six long-term U.S. technicians who will have a training and extension role under the project	4. Improved multi-disciplinary training syallabi; better trained staff; establishment field training center and demonstration activities for farmers.
5. Thirteen Peace Corps Volunteers who will assist the U.S. technicians and also play a training role.	5. Collaboration with Gambian livestock field agents and enumerators.
6. Workshops in training and communications.	6. Initiation and exposure to basic principles of training strategies and communications support techniques for 50 Gambians during each workshop.
8. Provision of better training materials.	8. Improved pre-service and in-service instruction through the widespread use of audio-visual support materials
9. Improved transport for staff with Honda motorbikes and one 22-passenger busses.	9. Increased mobility for Ministry staff in training and for participation in field trials, demonstrations and field days.

Participant Training Abroad

The following list of Gambian candidates for participant training in the U.S. or in African institutions has been discussed and approved in design meetings with Ministry officials. In most cases, the specific individuals have already been identified to undergo this training. The time frame has been carefully reviewed by Gambian authorities to take into consideration availability of substitute counterparts, the evolution of project components, and the general training and civil service staff situation in the Ministry. During the PID discussions,it was anticipated that most Gambian students could be trained at the Master's level. The Departments more recently, however, have confirmed that most of their known candidates are not sufficiently advanced to guarantee immediate success at this level. Therefore, degree level of course work will have to be evaluated by AID or the training institution on a case by case basis. Three of the candidates would do well to add to their two-year training program, a short course or observational tour in a second location. The forage agronomy student will spend six weeks in Australia to visit forage trials under climatic conditions similar to those of The Gambia. The rural sociology student will take the six-week course in his field offered in Wageningen, Holland. The extension education student will attend the six-week course in national agricultural development planning offered in Washington, D.C. under the Agricultural Sector Implementation Project (ASIP).

With regard to the training support sub-component, as described in Annex J., Component # 6, Section II., the purposes are:

1. To provide information on a regular basis to Gambian farmers concerning improved farming techniques.

2. To demonstrate to farmers that the Government is anxious to share information with them and encourage them to improve their lot.

3. To promote a sense of commonality of rural problems and cooperation in searching for solutions.

4. To build up the Government's capacity to provide effective extension services to farmers by contributing substantially to available trained cadres for producing graphic and audio-visual materials suitable for extension and training uses.

5. To allow farmers to play an active role in group activities and extension meetings after which they are rewarded by seeing themselves or hearing themselves through recordings.

TABLE II : PARTICIPANT TRAINING SCHEDULE

Entry Level	Course Level	Speciality	Student Number	Training Duration	Training Location	Training Start	Prospective Assignment
Diploma	B.S. M.S.	Forage Agronomy	1	2 years plus observational tour in Australia	U.S.	1980	Replace US Forage Agronomist/Abuko
Diploma	B.S.	Maize Agronomy	1	2 years	U.S.	1980	Replace US Maize Agronomist/Yundum
Diploma	B.S.	Extension education	1	2 years	U.S.	1979	Departmental Training and Information Unit/ Abuko
B.S.	M.S.	Agricultural economics	2	2 years	U.S.	1980 & 1982	PPMU/Ministry
B.S.	M.S.	Rural sociology	1	2 years plus observational tour in Holland	U.S.	1980	PPMU/Ministry
Diploma	B.A.	Communications	1	1 year	U.S.	1979	Extension Aids Un
B.A. or B.S.	M.A.	Communications evaluation	1	2 years	U.S.	1980	Extension Aids Un
Certificate	Associate Degree	Media technology and film production	1	1 year	Africa	1980	Extension Aids Unit
Certificate	Diploma	Graphics	1	1 year	Africa	1980	Extension Aids Unit
			Total 10 Participant Trainees				

15 Participant/years from 1979 to 1984

For detailed work plans, commodity lists and the like for both of the above sub-components, the reader is referred to the appropriate Annexes Annex J., Component # 6 Sections listed above.

The total cost of this component is US $403,000.

III. A. SUMMARY OF TECHNICAL ANALYSES

The technical analyses for the project paper are contained in full detail in Annexes H. and J.. As these analyses were written by six different technical specialists on the design team and cover seven different components of the project, it is impossible to do adequate justice to the depth or scope of these analyses in the brief abstract called for in this section of the project paper. The reader is therefore referred to the above two Annexes for full details of the technical analyses.

In general, the conclusions of the design team specialists are:

(1.) There have been ample initiatives undertaken by the Ministry of Agriculture and Natural Resources over the past decade to justify the project interventions proposed for research, field testing and subsequent extension to rural compounds over time. Some interventions, like improved animal health services, distribution of farm carts, provision of additional watering points away from the river for livestock and improved husbandry programs for small ruminants and poultry can be demonstrated now to have an identified clientale with a strong demand for the services. Others, like the maize improvement program, need further field testing and demonstration in The Gambia to prove their adaptability and economic worth; however, these same programs have been the subject of intensive research and development over time in other African countries with similar social, economic and physical conditions - e.g. research of on maize improvement in Northern Nigeria and Northern Ivory Coast. Other programs, like the forage introduction program requiring changes in cropping activities, the animal nutrition program, and the increased use of crop residues and animal manures in the farming systems, are relatively untested in the Gambian context. Finally, the team consensus was that the program proposed for range and research management in the rural areas is potentially the most important single element of this project but would also be the most complex, difficult and time-consuming activity area.

(2.) There is a strong team consensus that the only feasible way to proceed with the multiple and complex tasks proposed in this project paper is through the provision of a balanced specialist team representing appropriate disciplines that is explicitly dedicated to working in an interdisciplinary manner on all project interventions. The activities and demonstrations that will be carried out under this project require analysis and testing on aspects of technical agriculture, economics of agricultural production and marketing, and the sociology and anthropology of agricultural peoples in The Gambia. Considerable team discussion was devoted to the exact composition of the multidisciplinary team for the project so as to provide minimum representation of all required skills at a reasonable cost level.

(3.) There is also a strong team consensus that the assumption of the research, field testing and extension of project activities over the medium term can only be sustained if a cadre of Gambian specialists with strong academic training and directed and relevant work experience in The Gambia is built up in the course of Phase I of the project. This feeling pertains to both the senior level of technical expertise in the Ministry and to the field-level technicians and extension agents. There is, therefore, in the project paper annexes a series of lengthy discussions of how the project components relate to one another and thus foster interdisciplinary work on them and an extensive training plan for external participant training, in-country technical training, and improved methods of communications and feedback systems with the rural populace.

(4.) Finally, there is full acceptance by the team that the project as designed, is in the main, developmental in nature. It does not presume that fully tested technical packages exist in The Gambia for all the interventions proposed. Rather, the feeling is that the project component areas selected for concentration are of vital importance to the future development of Gambian agriculture and that one must foster a disciplined and continuous process of enquiry into solutions to the problems over time. It is quite possible and accepted by the team that some of the areas of intervention may prove over time not to be amenable to solution without high social or economic costs. However, with the team decision to orient all activities toward a starting point based on present status of the farming system(s) operative in The Gambia at present, there is considerable hope and expectation that the solutions derived from project activities will be within acceptable tolerance for change that has been demonstrated so often in the past by the Gambian farming communities.

III. B. SUMMARY OF SOCIAL SOUNDNESS ANALYSIS

The social soundness analysis, which appears as Annex K. of this project paper, is subdivided into sections on the Gambian social background, the socio-cultural landscape within which the project will operate, the social feasibility of the project interventions, the replicability of project activities, and the incidence of project benefits.

The social background section summarizes the salient features of the cultural geography, administrative orgranization, and demography of the country. Further, general information can be found in the AID/ Gambia DAP of November 1976.

The section on the socio-cultural landscape describes the two settings within which the project will work. On the one hand, there is the government institutional framework, and, on the other, the individual villages of the Gambian countryside. On the GOTG side, there is ample evidence of government commitment to the aims of this project, and of their capacity in terms of personnel, logistics, and management skills to carry out their contribution to the project. It is the will on the part of the GOTG technicians to work in the countryside, with and for rural people that is striking from the cultural viewpoint. On the side of the villages, the analysis points out the great changes that have taken place in farming practices over a century and a half of involvement in the world economy. The receptivity of Gambian farmers to innovations of clear utility to them has thus been demonstrated. The local social organization of production involves two levels: general decisions about new ideas and relationships with outside authorities are made at the level of the village, which is led by cohesive and autonomous group of village elders; production decisions are made at the farm level by extended co-residential family groups or "compounds", or by their component subgroups in the case of the large compounds. The planning and implementation of change programs in The Gambia, therefore has to work at both of these levels to achieve success.

The feasibility of project interventions is assured in a general way by these receptive bureaucratic and village contexts. In more specific terms, the project activities are feasible in different ways and in somewhat differing degrees. Some, for example the farm carts program, are ready to be implemented immediately. Others, like the maize improvement program, are likely to succeed but need testing for social as well as technical and economic feasibility at the farm level; still others, notably the range use planning activity, will need intensive socio-political studies at the village level before it can be judged how the program can best be mounted.

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TABLE I : PROJECTED BENEFICIARIES OF PROJECT ACTIVITIES

PROJECT ACTIVITY	BENEFICIARY GROUPS									
	Current LOA Members	Other Large Herd Owners	Oxen Farmers	Owners of only Small Stock	Herdsmen	Well-to-do Farmers	Average Farmers	Farmers with only Poorer Lands	Women	Village Traders/ Money Lenders
Dappo Marking	early	early			early		EARLY		EARLY	
Grazing Manage-ment	LATER	LATER					Later			
Forage Crop Development	LATER	LATER		LATER		LATER	Later			
Maize Development						EARLY	mid	mid	mid	
Carts Program	EARLY		EARLY			EARLY			early	
Cattle Fattening Schemes	EARLY		mid			mid				mid
Sheep Fattening Schemes				early					EARLY	
Extension Aids	EARLY		mid		MID		mid			

Notes:

(1) Early, mid, later refer to probable timing of significant impacts within life of project.

(2) CAPITAL letters refer to relatively intense probable impact; small letters to lighter or more indirect impact.

Replicability of the interventions is also variable. The use of revolving funds for several activities assures the widest spread possible of the limited resources available : it is a measure of the Gambian farmer's readiness to innovate that he does not need a long period of free inputs as inducements to try out new ideas. Other activities will be replicable on the combined basis of a demonstration effect and of the elaboration of the logistical apparatus (e.g. training, materials, transport, etc.) to sustain such activities in the field. The project will be effective on both these fronts.

Finally, the incidence of benefits also varies from activity to activity. A table, fully annotated with appropriate qualifications in the Social Soundness Analysis itself but included here as well, shows which programs will affect which categories of people in the rural areas, and gives some indication of when and how strong those effects will be. In general, it may be said, that the project can begin to benefit average farmers almost immediately by means of certain activities. Some activities will require careful monitoring by the project socio-economic unit to ensure that the benefits of this potentially lucrative program are not appropriated by a few rich merchants or money-lenders.

Women will benefit from the project in a number of ways: as rice farmers, they will have their work lightened through the farm carts program; as caretakers of the family's small ruminants and poultry, they will benefit from improved forages and feeds as well as improved land/resource management.

In sum, it is suggested that this project is more than simply socially "sound". It has been designed from the outset with close attention to the needs and capacities of rural Gambians. It represents an elaboration of planning done by the Ministry of Agriculture and Natural Resources technical staff and thus has their full commitment. It builds in a strong social and economic monitoring component which will ensure that the social goals made explicit in the project paper will, in fact, be achieved during project implementation.

III. C. SUMMARY OF ECONOMIC ANALYSIS

It is extremely difficult to deal with the economic analysis required for this project. The principal reason for this difficulty is that, while the problems of the Gambian rural economy can be enumerated fairly clearly, the project addresses those problems in an evolutionary manner. This is, the project itself is quite explicitly an organized process of economic, technical and social analysis directed toward developing appropriate packages of technologies for solution or, at least, amelioration of the enumerated problems. Since this is the case, the success or failure of the initial activities in the development and testing of technological packages under the various components over the first several rainy seasons will determine the direction and magnitude of the second and succeeding rounds of intervention, testing and field extension of proven practices. The process is, therefore, as described in Annex J., Component #5 , an open-ended one and the speed with which any particular package will be developed and extended to the farm level is unpredictable at the outset. Since some considerable specificity in both the timing and costs of project inputs and the resultant benefit flows is essential to the presentation of a realistic, quantitative cost/benefit analysis, this project does not lend itself easily to such analysis. Rather than allowing for such ex ante analysis in this project paper, the project is designed so that the economic analyses of individual component activities are an integral part of the project outputs.

In the same measure, the type of alternative economic analysis suggested in Handbook 3 - i.e. cost-effectiveness analysis - is not relevant since the objectives of the project itself specifically include the analysis of alternative technological strategies for cost-effectiveness in solution of existing problems on the individual component level and the entire project is an effort in organized and targeted research, development and training for the MANR for which there is no comparable precedent in The Gambia.

A. Definition of the major problems to be attacked

The Gambian rural economy today is a two-crop system associated with a relatively recent system of livestock raising. The two principal crops are groundnuts and rice. For historical reasons, the predominant flow of development resources has been targeted toward groundnuts as the principal cash crop and rice as the preferred grain staple. Groundnuts absorb the majority of input resources in terms of crop technology, fertilizers, animal power, and male labor. Rice absorbs the bulk of the remaining resources, including most of the productive energies of women. Animals, particularly as large ruminants, have been introduced into the farming system in a major way only in the last forty years and largely as a response to the needs to maintain soil fertility, ameliorate labor bottlenecks with animal power, and store wealth. Unfortunately, economic productivity of farm enterprises in all three areas is low and there is a high inherent vulnerability in the total farming system due to the natural consequences of weather variation and the vagaries of the international market for groundnuts.

In addition to the vulnerability of the evolved farming system, there are constraints imposed by social trends and the physical size of the country. The main characteristics of the existing system as detailed in Annex L. are briefly:

1. A growing scarcity of arable land on which to practice traditional extensive agriculture.

2. A declining active farm family labor force, due to outmigration of young adult males to urban areas, without any parallel decrease in human dependency on the agricultural base of the country.

3. Poor or non-existent management of lands not under annual crops - i.e. rangeland, fallow and forestry areas.

4. A diminished diversity of agricultural production which increases total vulnerability from monocultural cropping and over-concentration on cattle as the primary livestock resource.

5. A historically poorly developed and articulated structure within the country to assure continuous development, testing and extension of appropriate agricultural technologies to the farmer.

B. Definition of the beneficiary population to be reached

In the broad sense, the entire rural population of the country will be the beneficiary population for purposes of the project. Some elements of the project will touch the life of virtually every farm family in The Gambia. However, the economic analysis isolates certain factors which characterize the most vulnerable family situations. They are:

1. Any rural nuclear family compound with less than 12 members, without non-agricultural sources of income.
2. Any compound at some distance from the main roads on the upland side without housing with tin roofs and adequate utilities.
3. Any compound without access to riceland and/or without women laborers possessing the necessary skills and experience to grow rice efficiently.
4. Any compound that is newly established within a village area.
5. Any compound where family labor is allocated primarily to millet, sorghum and/or maize subsistence grain production and where cash cropping of groundnuts is a new or necessarily secondary activity.
6. Any compound without means to employ animal power in either tillage activities for crops or general cartage of goods.
7. Any compound whose livestock population is low in absolute terms and composed exclusively of sheep, goats and/or donkeys.
8. Any compound which regularly supports itself on subsistence credit obtained from traditional moneylenders in the form of liens against future grain crops.
9. Any compound where the primary activity of the adult male(s) is contract herding of cattle for other farmers.

These criteria were taken into account in determining the poorest and most vulnerable compounds in the rural community for special attention under the project. The project team took considerable pains in the design process to ensure that all interventions tested and extended in the course of the project would, at a minimum, be neutral with regard to adoption by these most needy compounds. In a number of cases, deliberate efforts were made to tilt project benefits in favor of these more disadvantaged compounds. The rationale behind these actions and the process followed by the team is explained in greater detail in Annex K..

C. Commentary on the input mix selected for the project

The economic analysis in Annex L. investigates the input mix of resources to be devoted to the project and concludes that the mix is basically determined by the five person long-term technical assistance team and its Gambian counterparts and the senior personnel to be trained under the project. It judges the flow of resources to be logical in content and moderate in cost.

D. Commentary on the expected outputs of the project

The economic analysis isolates eighteen major outputs from the project over the first Phase which can be reasonably expected to materialize. The list is detailed in Annex L., Section D.

E. Estimation of probable impacts of the project activities and linkages with other rural development activities

In essence, the project is a major effort in research, development and training for the Gambian agricultural sector. It is intimately linked through joint efforts in design to the IBRD/RDP effort. When taken and evaluated together, the two projects hold out distinct possibility for major positive changes in the rural sector. Between them, they treat the rural family compound as an integrated farming system for the first time and address themselves to the needs of that system through strengthening appropriate enterprise technologies and stressing the interrelationships and interdependencies that exist between crop and livestock activities. The focus on creative use of production credit in both programs through the Gambia Cooperative Union's new consolidated pattern of district level cooperative branches can only bring beneficial changes and added strength to an equitable rural financial system. The training of technical and support staff for the Ministry under both programs will ensure that a cadre of well-trained and field-experienced local specialists will be available in the near future to wholly assume to the burdens of executing rural programs. The buildup of training and research facilities for mixed farming programs at Genoi, Sapu and YBK upcountry and in the Yundum/Abuko area near the capital will assure that the country has a functioning system of interrelated agricultural centers throughout the rural areas to permit regional research trials and the stationing of senior personnel of the MANR in close proximity to their rural clientele. Finally, the institutionalization of the socio-economic unit for planning and evaluation within the MANR, coupled with improvements in the research station network and capacity, should assure for the first time the continuous flow of agricultural innovation and appropriate technologies that will be so critical to the successful evolution of the Gambian farming system(s) over the remainder of this century and beyond.

III. D. SUMMARY OF THE ADMINISTRATIVE ANALYSIS

This analysis of administrative factors which may affect the project is the result of detailed observation of the Ministry of Agriculture and Natural Resources' operations and staff over the period from November 1 976 to September 1978. Ministry budgets for four budget years have been analyzed; virtually all senior-level personnel of the Ministry and a large segment of the junior staff have been interviewed and/or obsrved in the field in performance of their various assignments; Ministry staff performance vis-a-vis its rural clientele has been carefully monitored over time in question and answer sessions with over 3,000 farmers and numerous other farmer group observations in the field; and finally, Ministry performance vis-a-vis previous AID/GOTG activities in The Gambia have been evaluated on the basis of existing AID records and in-house staff discussions.

Before specifically addressing the six separate areas of concern outlined for consideration in Handbook # 3 for the administrative analysis, it is best to lay out the administrative structure within which the project will function.

The principal agencies which have been involved in the design and/or will be involved in the implementation of the project are the Ministry of Agriculture and Natural Resources (MANR) of the Government of The Gambia; the AID office in Banjul; technical assistance support specialists from REDSO/WA in Abidjan; and an American Title XII land grant university. The first three of these have collaborated intimately in the complete process of conceptualization of this project from the initial starting point of the AID GAMBIA DAP exercise in November 1976, to the PID submission in February 1978, to the final design of the project as represented by this project paper.

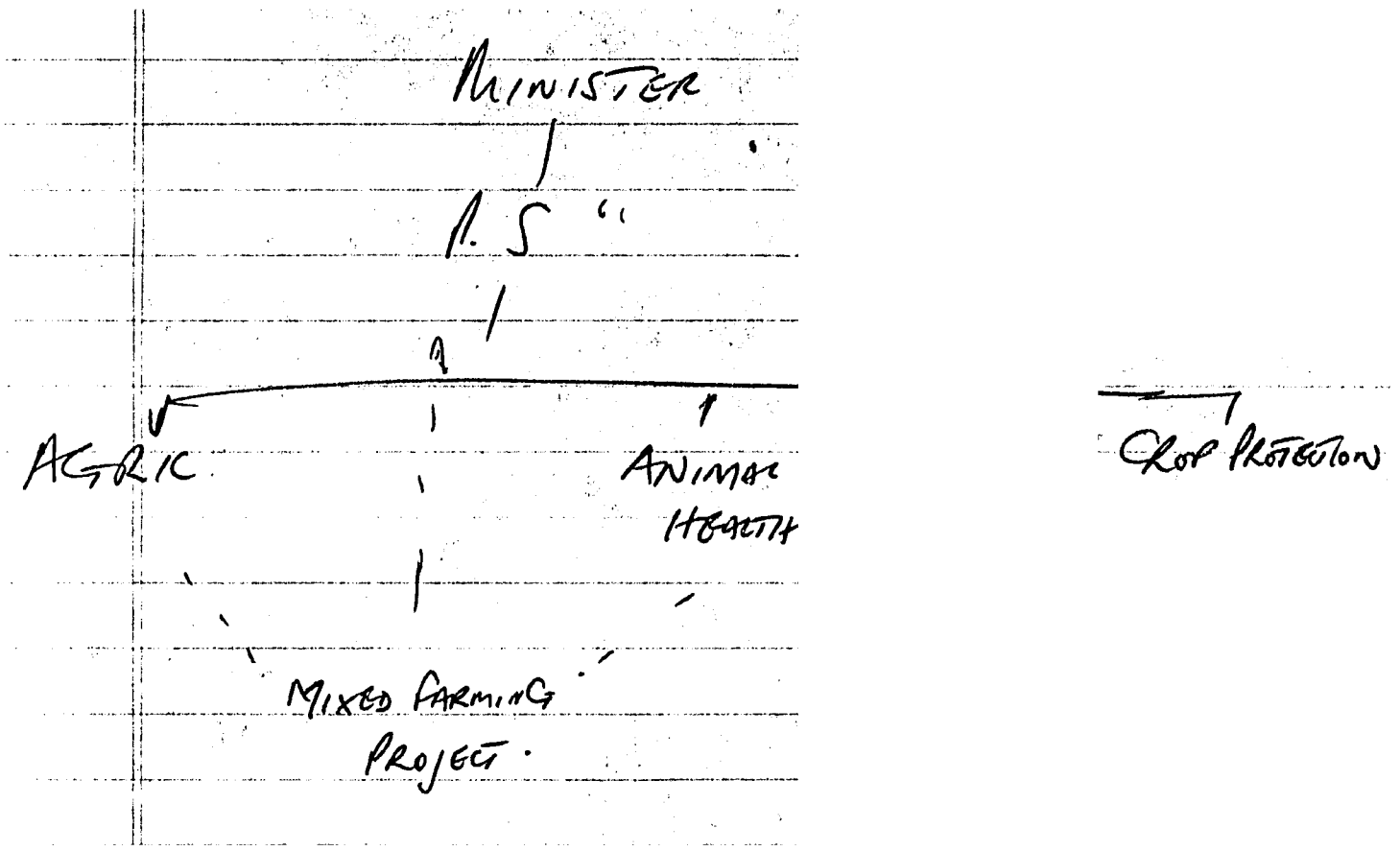
The project, as designed, will be implemented by the MANR with support assistance of the AID office in Banjul in the person of an AID direct-hire project manager and the technical assistance of an American Title II University team consisting of five long-term specialists and a number of short-term consultants as called for in the seven project components. The responsibility for the implementation of the project will be in the Office of the Minister of the MANR in the person of the Permanent Secretary, who is the highest ranking civil servant of the Ministry and its principal executive officer. For purposes of administration, planning and execution of project activities, and coordination with all other donor agencies with projects in the field of rural development, the project will function through two permanent units of the Ministry within the Office of the Minister. They are the Program Planning and Management Unit (PPMU)

and the Project Coordinating Committee (PCC). The former is the overall planning and programming unit of the Ministry at a supra-Departmental level and consists of the Permanent Secretary, the Directors of all operational branches of the Ministry, the Managing Director of the Gambia Produce Marketing Board (GPMB), the Managing Director of the Gambia Livestock Marketing Board (GLMB), the project manager of the IBRD/RDP, and such other representatives of other Ministries of the Government as are requested to participate by the Permanent Secretary - e.g. representatives from Economic Planning, Finance, the Central Bank, the Office of Central Statistics. The Unit is supported by a permanent professional planning staff of Gambians and Expatriates consisting of the following specialities : agricultural planning/ macroeconomics, agricultural marketing, cooperatives operations, agricultural credit, agricultural statistics, and a number of technical agricultural skill areas like animal science, veterinary medicine, agronomy and forestry. To the existing expertise will be added the skills provided by AID in the form of U.S.D.A. personnel in the Ministry Soil and Water Management Unit.

The professional team provided under this project will become an integral part of the PPMU and will work through the Unit in performanceof its daily project implementation tasks with the various operational Departments of the Ministry - e.g. the maize agronomist with the Department of Agriculture: the range management/ecology specialist with the Department of Animal Health and Production; the forage rural sociologist with all Ministry Departments. Routine team representation and liasion at PPMU meetings will be the primary function of the AID direct-hire project manager and the university team's designated chief of party, who will be one of the team specialists. All other technicians will work directly at the PPMU planning staff level and attend general PPMU deliberations as called upon for technical expertise.

Project coordination with other donor agencies will be conducted formally through the PCC. This committee consists of the Permanent Secretary, the Directors of all Departments, and the Managing Directors of the GPMB and the GLMB with representatives from all external donors having projects in rural development. Primary representation on the PCC will again be through the AID project manager and the university team's chief of party. And, of course, in a country as small as The Gambia, there is always adequate scope for informal contact, discussion and coordination in daily activities on an informal level with all major donor representatives for all team members.

With regard to the six specific areas of concern listed in Handbook # 3, the following comments are submitted:


MINISTER
P.S
AGRIC
ANIMAL HEALTH
CROP PROTECTION
MIXED FARMING PROJECT.

AGRICULTURAL DEVELOPMENT PROJECT

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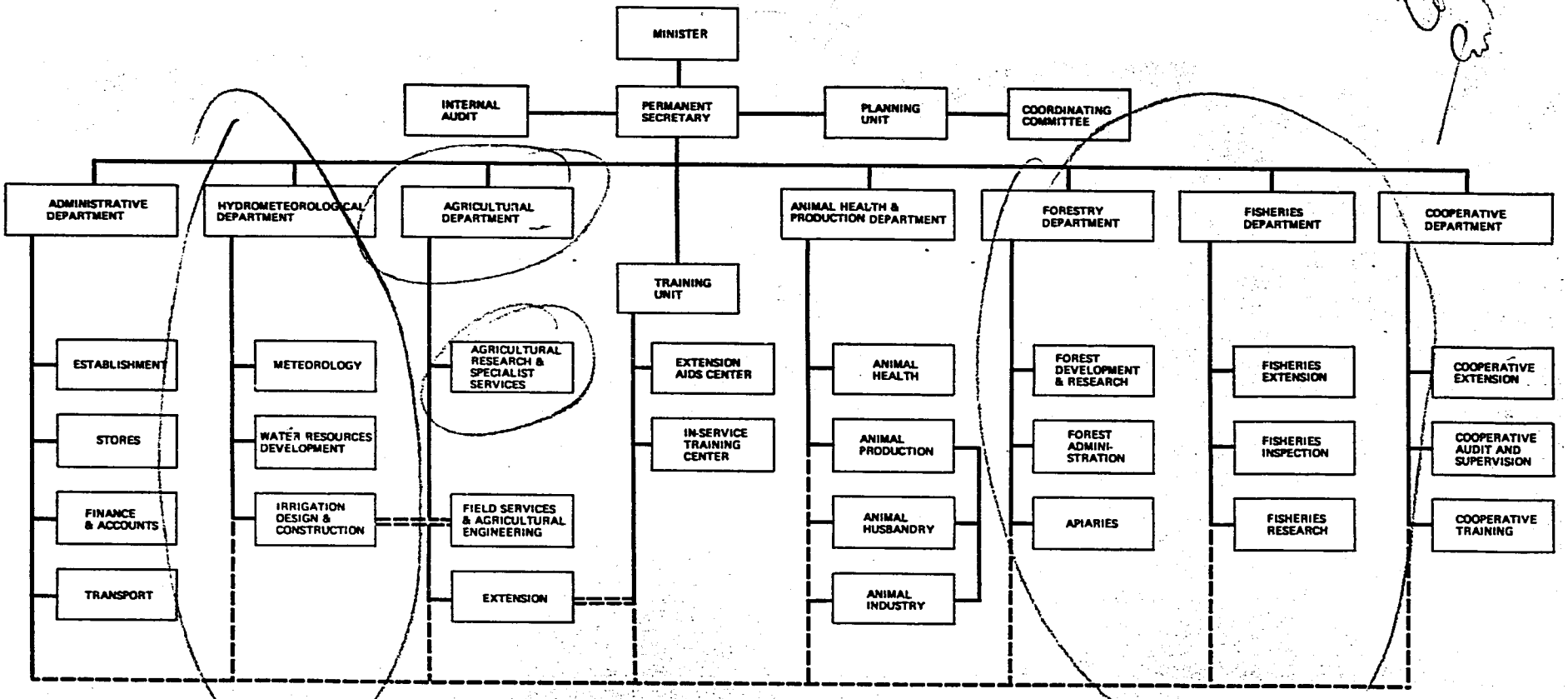

ADMINISTRATIVE SUPPORT

CLOSE WORKING LIAISON

THE TRAINING UNIT, EXTENSION AID UNITS AND IN-SERVICE TRAINING UNIT ARE AVAILABLE TO ALL DIVISIONS.

December 1975

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1. Local Leadership

In regard to the leadership of the Ministry in the persons of the Permanent Secretary and the Directors of the operational Departments, one observes a cadre of young professionals, mainly in their 30s and 40s, with a minimum of university training at the Bachelor's level. A substantial number have advanced degrees or other training specialized fields and all have extensive on-the-job experience. Over the two years of observation prior to the design of this project, there has been a consistently high level of expertise and leadership displayed in all the senior management positions of the MANR, even though personalities have changed in several of the key positions - e.g. the Permanent Secretary has been changed once, the Director of the Department of Animal Health and Production as has changed, and the Director of Hydrometeorological Services has changed. In all cases of personnel change, except at the Permanent Secretary level, incumbents have moved to higher positions within the Government structure and been replaed by trained personnel from within the staff ranks of the MANR with technical expertise in relevant fields. The personnel in key positions of the Ministry are, thus, technocrats by professional training, personal inclination and Government civil service regulations. While there is no question that all of these technicians represent a technocratic elite within the country by virtue of their superior educational and job experiences, there is no particular evidence of excessive family, tribal or interest group involvement in or manipulation of their selection for the positions they hold in the bureaucracy. In all cases under observation in the office and the field, officers of the Ministry have displayed good to superior knowledge of their jobs and personal leadersnip in Ministry dealings and in relationships with their rural clientele.

Since the second and third levels of senior officers are similar in background and training to the present leaders in the MANR - and those leaders themselves are still relatively young men - one can only project a reasonable continuity in both quality and style of leadership for the Ministry over the foreseeable future.

2. Structure

A.) With regard to the legality of the implementing organization, the MANR is the rural development agency of the Government of The Gambia. It is a permanent agency. It has full legal authority to implement all project activities as envisaged. There is nothing anticipated under the project that would be impossible to accomodate either within the present mandate of the Ministry or through Ministry appeal to the Office of the President and, through it, to the legislative apparatus of the Government.

B.) The pattern of internal MANR operations, as it relates to the project, has been described above in the analysis. There are no discernable strategic weaknesses in the Ministry structure that could be predicted to irreparably hinder project implementation. There is a strong current within the Ministry planning and operations at present - and extending back over several years - toward elimination of the weakness associated with an inherited system of administration that saw the various Departments of the Ministry as essentially independent actors under the general Ministry umbrella with separate budgets and separate work programs which were rarely tightly coordinated with one another. The present articulation of the Ministry's planning and coordination apparatus through the PPMU and the PCC are the most obvious examples of this trend; but other developments like the evolution toward a joint training curriculum for all Ministry extension personnel before specialized training, the field placement of staff from different Departments in unified groups at the Mixed Farming Centers to service the rural populace, the pooling of vehicle and other supply resources, and the joint preparation of Ministry outreach and extension programs for the media confirm the favourable movement.

C.) With regard to informal structure and operations of the Ministry, one can observe, as in any organiztion of any size, dominance in certain areas by strong and ambitious personalities. In a situation where resources are definitely finite, there is considerable activity and jousting among Departments and between senior personalities within them to justify programs and/or pet projects. However, there is no particular evidence that this is, in any sense, a destructive or inhibiting factor to project implementation and, in an overall context, it is probably more affected by the whims, prejudices, plans and approachability of the various external donor agencies than by the internal conflicts themselves. Ministry operations give every evidence from the outside of being lively, dynamic and flexible in approach with regard to both competition for available resources and mutual cooperation in support of agreed programs.

3. Role and Commitment

The role of the MANR has been discussed in numerous places in this paper and is largely self-evident by its title. The activities in the project were designed in direct collaboration with the Ministry over the past two years and are wholly compatible with the Ministry's mandate and overall planning. Although there are several activities in the project which are "new" in the sense of impetus and funding availabilities - e.g. range management activities, more intensive land use planning - there are no activities that are outside the stated agenda of the Ministry and the Government. Project activities have been endorsed at all levels of

the Ministry structure and, more importantly, in organized and numerous meetings with the rural populace through the Livestock Owners Associations, the Gambia Cooperative Union branches, and other rural organizations. Through these organizations and regular Ministry radio programs, a very large percentage of the farm families in The Gambia has already heard about the key activities to be undertaken by this project and, indeed, have participated themselves in a very real way in decisions as to the priorities set for the project.

There are numerous incentives built into the project for existing and future Ministry staff. These incentives include but are not limited to better professional training opportunities, expanded program responsibilities, increased job and promotion opportunities, increased field work and, therefore, increased travel allowances, and the like.

4. Resources

The Ministry in implementation of the project is backed by the full resources of the Government. With the training, commodities and other funding to be supplied under the project and the existing human resources of the country, there is every evidence that a sound and adequate base already exists and can be built upon to implement project activities. Implementing agencies in developing countries can always, in the larger sense, be said to be understaffed and underfinanced as those factors are key constraints to any development process. However, the Gambian situation is certainly no worse in this regard than the situations in many neighboring countries participating in the CILSS program. The two major areas of personnel weakness as regards project activities are the lack of Gambian agricultural economists and rural sociologists but, in many ways, the country is considerably better off in trained manpower vis-a-vis its size and the total number of rural people than its neighbors. To the extent that critical weaknesses, which would hinder field operations of the project, have been identified in project design, they have been dealt with through project inputs. The project has been explicitly designed, however, to account for the present and likely future capacities of the Ministry's Departments to handle project activities. Great stress has been placed on better utilization of existing resources i.e. training facilities, laboratories, field stations - and on upgrading the professional skills of existing personnel, rather than adding great quantities of new manpower to the Government payroll or facilities and equipment that require inordinate amounts of time and money to maintain and operate. Great stress has also been placed on setting up a process

to develop and extend agricultural interventions directly to the farming community in such a way that the major responsibility for adoption and execution of the interventions falls, not with the Government, but with the individual farm families and the self-organized farm groups like the Livestock Owners Associations and the women's cooperative work groups.

5. Outside Administrative Environment

One of the most impressive factors in the development of this project, which is remarked upon by almost every technician who played any part in the process, is the extensive and enthusiastic participation of the rural people of the country in the formulation of project priorities. Through direct contact with farmer groups that represent a good cross-section of the rural populace and numerically represent, perhaps, ten percent of the total rural compounds, there has been much two-way interchange on project activities, present Ministry programs, and more general development issues. During the entire period of these meetings over the last two years, there has been a continuous evidence of mutual respect and appreciation of Ministry activities to date. Where there have been failures in programs, farmers have not hesitated to stand up in public meetings - with the media present - and strongly express their dissatisfaction with both overall Ministry efforts and individual technician performance. In this regard, the climate for interaction, crticism and constructive collaboration in project activities is demonstrably as good or better than that in any other country participating in the CILSS program. This climate is obviously fostered by the democratic traditions of the existing Government and the fact that the rural populace is actively encouraged to and does participate in the political process. Rural people in The Gambia fully realize that they can personally affect the future directions of the development of their country. Interactions with Government officials are direct, frequent and open on both sides. Organized farmer groups can easily and freely express both their satisfactions and discontents with the course of Ministry planning and implementation and do not hesitate to do so openly. It is, in brief, a very healthy climate in which to begin project activities.

6. Grass Roots Managerial Considerations

The direction and intensity of benefit flows from the project to identifiable groups within the rural community of The Gambia are shown and discussed in Annex K.: Social Soundess Analysis of Project Components. The principal organized but non-governmental agencies within the country which will participate directly and formally in the project are the Livestock Owners Associations of which there are forty-two. These Associations

will be key designers, testers and adopters of project interventions like livestock fattening trials, the farm carts program, the improved forage program, and better animal health coverage. It is planned that all activities promoted through the LOAs will be self-sustaining in technical, economic and social terms. In order to accomplish this, LOA members will participate in international training and in-country training courses at the YBK Training Center, and individual association training sessions in credit and supply management and the organizational aspects of running their own associations more effectively. Since these LOAs are already organized with executive committees and regular meeting scheduled and are registered with the Government as producer representative groups, an institutional structure and base of talented local farmers is already available to start project activities.

III. E. SUMMARY OF ENVIRONMENT ANALYSIS

An initial environment examination was conducted during the design of this project paper and is contained in Annex E. The analysis recommends that, in view of that facts that this project will provide technical assistance and training which coupled with the other inputs will provide better management of agricultural resources and a lessening of stress on the land and environment, a negative determination is appropriate and that the project will not require an environmental assessment. The list of Pages 91 and 92. supports this recommendation, showing little or no environmental impact expected for all impact areas and sub-areas.

IV. FINANCIAL PLAN FOR THE PROJECT

The total United States contribution to this project will be $ 6,000,000. Approximately 26% of the budget will consist of local procurement and services; the remaining 74% will be reserved for foreign exchange purposes.

Funding is scheduled for six separate but interrelated components components that will be implemented simultaneously during the five years of Phase I of the project. Allocated funds in each component will be variously utilized for technical assistance, commodities, and supplies, training, construction, operating costs, revolving funds, and the like. Provisions were set up for interest payments on all revolving fund disbursements to farmers of 11% per annum. This rate conforms to the standard rate of interest charged to farmer credit purchases under the

IBRD Rural Development Project. It is approximately the real commercial bank rate for The Gambia.

All financial accounting necessary for the implementation of this project are shown in the financial tables, Annex O. These tables have been reproduced in this section for the convenience of the reader.

The above tables, with the addition of the financial tables of Annex O. conform in slightly modified form to the Handbook # 3 requirements for this section. All costs included in the tables were taken from local costs tables complied for The Gambia based on dealer interviews by team members, actual price statements as in the case of local construction, readily available price lists and catalogues for supplies and equipment to be purchased externally, and estimated costs of technical assistance personnel for long and short-term employment based on accumulated REDSO/WA design experience. Commodity lists and prices were reviewed by the REDSO/WA regional procurement specialist in Abidjan. Construction estimates were reviewed by the REDSO/WA engineering staff.

Due to the nature of this project, as discussed in numerous other sections and Annexes of the project paper, it was not possible to make any realistic evaluation of the recurrent cost implications of project activities at this time. Recurrent costs to be assumed directly by the Government of The Gambia over time after the end of AID direct financing are entirely dependent upon which interventions undertaken by the project are proven to be successful solutions to existing agricultural problems and, further, on the extent to which these interventions are adopted by Gambian farm families.

Generally, the review of known and identified recurrent costs show that they are minor additions to the existing Government structure. These additional costs in qualitative terms are:

A.) Operating expenses for vehicles supplied under the project which will be assumed from the first day of the project by the GOTG.

B.) Additional costs in salaries and various allowances which will result from the technical upgrading of skills of the present Ministry personnel who participate in external training programs.

C.) Minor costs for additional field allowances for existing Ministry staff due to an increase in days spent in the field servicing the various rural activities under the project.

The costs which can be estimated at this time are quantified below.

A.) Building maintenance and operating expenses for the technician housing:

Maintenance

1. Technician housing: $325,000/30 years	$10,700

Operating Expenses:

2. Technician housing:	
A. utilities	
5 houses x $2,500/each	$12,500
B.) Vehicles	
1. 9 Land Rovers @ $0.30/miles x 10,000 miles/years	$27,000
2. 2 Trucks and 1 Buses @ $0.50/mile x 5,000 miles/year	$7,500
3. 74 motorbikes x 2,000 miles/year each x $0.05/mile	$7,400
4. Tractors: 2 x $1,500/year	$ 3,000

C.) Staff costs borne by the project as per table 4	$79,000
D.) Technical upgrading as result of participant training: 10 technicians x average of $1,000/person	$ 10,000
E.) Additional Field Allowances for local personnel:	
100 persons x $3.00/night x 50 nights/ nights/year	$17,000
Total estimated recurrent costs (annual basis)	$174,000

V. IMPLEMENTATION PLAN FOR THE PROJECT

Detailed implementation activities for the life of the project are contained in Annexes M. and N. of this project paper. The critical performance indicators have been used as a guide to monitor the events of the project. These indicators are listed in detail in Section III. of Annex N. and, as the list is eight pages long, single-spaced, they are not reproduced in this section.

The following presentation of the implementation plan for the project is in three sections:

1. ADMINISTRATIVE ARRANGEMENT FOR IMPLEMENTATION AND MONITORING

The principal agencies to be involved in the implementation and monitoring of this project are the Ministry of Agriculture and Natural Resources of the Government of The Gambia; the AID office in Banjul, The Gambia, supported by the AID Regional Controller's Office in Dakar and REDSO/WA in Abidjan; and an American Title XII land grant University.

All project implementation activities will be primary responsibility of the Ministry of Agriculture and Natural Resources acting through such contractual arrangements as are called for in the following section on project procurement.

All project monitoring activities with regard to AID financing, obligations of the parties to the Project Agreement, critical performance indicators, and the like will be the primary responsibility of the AID direct-hire project manager, who will serve as a permanent staff member of the AID office in Banjul, The Gambia and report to the head of that office. The AID project manager will be assisted in his monitoring of financial disbursements under the project by the AID Regional Controller's Office, presently located in Dakar, Senegal.

Table 1 Summary of Project Costs by Functional Category
(dollars in thousands)

Functional Category	FY 79	FY 80	FY 81	FY 82	FY 83	Total
I. Technical Assistance	849	600	810	360	360	2,979
II. Training	-	45	161	51	11	268
III. Construction	-	328	9	-	-	337
IV. Equipment and Supplies	-	318	431.4	-	-	749.4
V. Revolving Fund Accounts	-	125	125	-	-	250
VI. Operating Costs	-	106	106	106	106	424
Total Direct Costs	849	1,522	1,642.4	517	477	5,007.4
Inflation @ 10% compounded	-	152	305.6	141	186	784.6
Contingency @ 5%	-	76	82	26	24	208
Grand Total	849	1,750	2,030	684	687	6,000.0

Table 2 Breakdown of Project Costs by Project Component
(dollars in thousands)

	Project Component	FY 79	FY 80	FY 81	FY 82	FY 83	Total
I.	Land resource and use evaluation, classification and cartography	849	-	-	-	-	849
II.	Grazing areas development and management	-	292	272	101	101	766
III.	Improved crop and forage production and management	-	510.35	484.05	127.5	127.5	,249.4
IV.	Improved rural technology	-	141	152	-	-	293
V.	Strengthening ministry evaluation and planning capacity	-	494.5	477.5	237.5	237.5	,447
VI.	Agricultural skills training and communications	-	84.15	256.85	51	11	403
Total direct costs		849	1,522	1,642.4	517	477	5,007.4
Inflation @ 10% compounded		-	152	305.6	141	186	784.6
Contingency @ 5%		-	76	82	26	24	208
Grand Total		849	1,750	2,030	684	687	6,000

Table 3

Breakdown of Project Costs by Functional Category and Financial Classification (dollars in thousands)

Functional Category	Foreign Exchange	Local Costs	Total
I. Technical Assistance	2,979	-	2,979
II. Training	233	35	268
III. Construction	57	280	337
IV. Equipment and Supplies	556.4	193	749.
V. Revolving Funds	-	250	250
VI. Operating Costs	-	424	424
Total Direct Costs	3,825.4	1,182	5,007.4
Inflation	70,6	314	784.6
Contingency	125	83	208.0
Grand Total	4,421	1,579	6,000.0

Table 4

Detailed Breakdown of Project Budget
(dollars in thousands)

Funding Item	FY 79	FY 80	FY 81	FY 82	FY 83	Total
I. Technical Assistance	849	600	810	360	360	2,979
A. Long Term:		PM				
1. Range Ecologist	-	120 9.6 - 12	150 12	90	90	45 36 450
2. Forage Agronomist	-	120 9.6 12	150 12	90	90	45 36 450
3. Maize Agronomist	-	90 7.2 9	180 14.4	-	-	27 21 270
4. Agricul. Economist	-	120 9.6 12	150 12	90	90	45 36 450
5. Rural Sociologist	-	120 9.6 12	150 12	90	90	45 36 450
B. Short Term:		12.5				207 165 17.25
1. Aerial Photography	400	-	-	-	-	400
2. Land Classification, cartography & training	449	-	-	-	-	449
3. Range Management Specialist	-	20	20	-	-	40
4. Agricultural Engineer	-	10	10	-	-	20
I. Training	-	45	161	51	11	268
A. External Participant Training:						
1. 15 person years as per list in component #6	-	45	118	51	11	225
2. Workshop on training methodology	-	-	35	-	-	35
3. 6-month applied training on farm structures	-		8	-	-	8

@ $1450 /pm

	FY 79	FY 80	FY 81	FY 82	FY 83	Total
III. Construction	-	328	9	-	-	337
1. Technician Housing - 5 houses @ $65,000	-	325	-	-	-	325
2. Crop storage demonstration units	-	3	9	-	-	12
IV. Equipment and Supplies	-	318	431.4	-	-	749.4
A. Vehicles	-	(185.2)	(178.2)	-	-	(363.4)
1. Six 4-wheel drive all terrain vehicles with long wheel base @ $18,000 POE	-	54	54	-	-	108.0
2. Three 4-wheel drive, all terrain vehicles with short wheel base @ $13,000 POE	-	13	26	-	-	39
3. Two 7-ton, all terrain trucks @ $25,000 POE	-	25	25	-		50
4. 22-passenger bus @ $25,000	-	25	-	-		25
5. Cinema van @ $25,000	-	-	25	-		25
6. Twenty 120 cc all-terrain motorbikes @ $1,200 POE and Fifty-four 50 cc motorbikes @ $600 POE	-	28.	28.2	-		56.4
7. Three tractors with oil bath cleaner, 3 point hit and draw bar @ $20,000 PC		40	20			60

	FY 79	FY 80	FY 81	FY 82	FY 83	Total
B. Vehicle Equipment:		(15.8)	(9.2)	-	-	(25.0)
1. Jerry cans @ $30 POE		.4	.4	-	-	0.8
2. Three trailers for tractors @ $1,500 POE	-	3	1.5	-	-	3.5
3. Three double-disc harrows @ $5,000 POE	-	10	5	-	-	15
4. Motorbike repair kits @ $100 POE for 120 cc and $50 POE for 50 cc	-	2.4	2.3	-	-	4.7
C. Laboratory and Field Testing Equipment	-	(10.9)	(45.6)	-	-	(56.5)
1. Two electric forage driers @ $3,000	-	-	6	-	-	6
2. Forty-five Chatillon Dynometer Scales (25 lb capacity)	-	2.5	2	-	-	4.5
3. Six Toledo balances (500 gram capacity)	-	1.2	.6	-	-	1.8
4. Triple beam balances (Six) (25 lb capacity)	-	1.2	-	-	-	1.2
5. One seed grader	-	-	5	-	-	5
6. Two commercial-type maize shellers (small scale)	-	-	20	-	-	20
7. 6,000 Burlap bags	-	4	8	-	-	12
8. 2,000 Cloth bags	-	2	-	-	-	2
9. Two plant presses with pressing and drying materials	-	-	1	-	-	1
10. Ten tube-type 10-gram Gray metric scales	-	-	.3	-	-	0.3

	FY 79	FY 80	FY 81	FY 82	FY 83	Total
11. Ten vegetable sampling frames	-	-	.5	-	-	0.5
12. Eight pocket stereoscopes	-	-	1	-	-	1
13. 1,000 Vegetation sampling forms (SCS - Range - 417)	-	-	1.2	-	-	1.2
D. Socio-economic Unit Equipment	-	(21.0)	-	-	-	(21.0)
1. Sixty clipboards	-	0.3	-	-	-	0.3
2. Twelve measuring wheels	-	1.2	-	-	-	1.2
3. Twelve measuring tapes	-	0.3	-	-	-	0.3
4. Twelve compasses	-	0.3	-	-	-	0.3
5. Ninety shoulder bags for equipment	-	1.4	-	-	-	1.4
6. Six calculators with printout	-	0.6	-	-	-	0.6
7. Two Texas Instuments SR 59 calculators with printers	-	0.6	-	-	-	0.6
8. One 100k desk-top mini-computor (Horizon North Star) with teleprinter, CRS, visual display, floppy discs, cassetts, tape input, storage capacity, & SPSS software package	-	16	-	-	-	16
9. Six calculators without printout	-	0.3	-	-	-	0.3

	FY 79	FY 80	FY 81	FY 82	FY 83	Total
E. Office Equipment and Supplies	-	-	(25.0)	-	-	(25.0)
1. Two electric typewriters	-	-	1.5	-	-	1.5
2. Three manual typewriters	-	-	0.5	-	-	0.5
3. One photocopier	-	-	1.6	-	-	1.6
4. One mimeograph machine	-	-	1.0	-	-	1.0
5. Ten desks	-	-	1.6	-	-	1.6
6. Six tables	-	-	0.6	-	-	0.6
7. Ten filing cabinets	-	-	1.0	-	-	1.0
8. Thirty chairs	-	-	0.7	-	-	0.7
9. Ten desk lamps	-	-	0.5	-	-	0.5
10. Six sets of camping equipment for bush trips (stove, tent, sleeping bag, cot, mosquito net, etc.) @ $1,000	-	-	6.0	-	-	6.0
11. Book sets for technical library			7.0	-	-	7.0
12. Miscellaneous office supplies			10.0	-	-	10.0
F. Fencing and Miscellaneous tools		(35.6)	(50)	-	-	(85.6)
1. 33,000 meters of 3 meter woven wire		11	24	-	-	35
2. 66,000 meters of barbed wire		6	10	-	-	16
3. 12,000 creosot-treated fence posts		8	16	-	-	24
4. 88,000 fence staples		4.4		-	-	4.4
5. Fifty hand		0.75		-	-	0.75

	FY 79	FY 80	FY 81	FY 82	FY 83	Total
6. Fifty garden rakes	-	0.75	-	-	-	0.75
7. Twenty heavy duty hammers	-	0.3	-	-	-	0.3
8. Twenty shovels	-	0.4	-	-	-	0.4
9. Twenty fencing tools	-	0.4	-	-	-	0.4
10. Twenty wire cutters	-	0.4	-	-	-	0.4
11. Four fence stretchers (c-clamp style)	-	0.2	-	-	-	0.2
12. Four fence stretchers (2 pulley rope style)	-	0.2	-	-	-	0.2
13. Fifty hand-operated maize shellers	-	0.5	-	-	-	0.5
14. Ten grass shears	-	0.1	-	-	-	0.1
15. Four mechanic tool kits @ 600 POE	-	2.4	-	-	-	2.4
G Equipment for Training and Communications	-	(24.5)	(23.9	-	-	(48.4)
1. One portable video-tape set (camera, microphone, tape recorder, playback, monitor, and part-3/4" color)	-	-	7.0	-	-	7.0
2. Fifty video cassettes, one hour length	-	-	2.5	-	-	2.5
3. Fifty transitor radios	-	4.0	-	-	-	4.0
4. Two reel-to-reel tape recorders	-	0.5	-	-	-	0.5
5. Production and processing of film	-	2.0	9.3	-	-	11.3

	FY 79	FY 80	FY 81	FY 82	FY 83	Total
6. Recording tapes and cassettes	-	1.4	-	-	-	1.4
7. Six cassette tape recorders	-	0.9	-	-	-	0.9
8. Training materials and supplies	-	15.0	5.0	-	-	15.0
H. Forage and Feed Analysis Laboratory	-	-	(89.5)	-	-	(89.5)
1. Fiber analysis apparatus	-	-	3.0	-	-	3.0
2. Wiley Mill Grinder	-	-	0.5	-	-	0.5
3. Water bath	-	-	0.5	-	-	0.5
4. Kjeldahl conbination unit for distillation and digestion (12 unit, electrical)	-	-	5.0	-	-	5.0
5. PH meter	-	-	1.0	-	-	1.0
6. Drying oven	-	-	6.0	-	-	6.0
7. Muffle oven furnace	-	-	1.5	-	-	1.5
8. Two precision balances	-	-	3.0	-	-	3.0
9. One hundred Gooch-type crucibles @ $5	-	-	0.5	-	-	0.5
10. Assorted laboratory glassware	-	-	10	-	-	10.0
11. Assorted clamps, rubber tubing connectors, etc	-	-	1	-	-	1.0
12. Chemicals and reagents	-	-	2	-	-	2.0
13. Water distillation unit	-	-	0.5	-	-	0.5
14. Two air conditioning units for laboratory	-	-	1	-	-	1.0
15. Exhaust system for laboratory	-	-	3	-	-	3.0
16. Renewable chemicals, reagents and glassware	-	-	40	-	-	40

	FY 79	FY 80	FY 81	FY 82	FY 83	Total
17. Atomic absorption spectrometer (Minerals except phosphorous)		-	10.0	-	-	10.
18. Spectrophometer (phosphorous analysis)		-	1	-	-	1
I. Miscellaneous Equipment and Supplies		(25.0)	(10.0)	-	-	(35.0)
V. Revolving Fund Account		125	125	+	-	250
A. Funds for purchase of equipment by farmers		125	125	-	-	250
VI. Operating Costs						
A. Personnel		(79)	(79)	(79)	(79)	(316)
1. Office Support		11	11	11	11	44
2. Field Work		21	21	21	21	84
3. Enumerators		47	47	47	47	188
B. Vehicle Maintenance		21	21	21	21	84
C. Materials		6	6	6	6	24
1. Seed and fertilizer						

Table 5

Estimated Host Country Contribution
(dollars in thousands)

	Functional Item	FY 79	FY 80	FY 81	FY 82	FY 83	Total
I.	Salaries and indemnities for local personnel	160	196	196	196	220	968
II.	Values of sites and services	96	8	8	8	8	128
II.	Operating Costs	40	40	40	40	40	200
	Total	296	244	244	244	268	1,296

(22% of total U.S. contribution)

The American Title XII University, which will contract to supply technical staff for the project, will be selected by the GOTG and AID on the basis of the established process of the Title XII BIFAD committee based in AID/W. It is anticipated that the relationship between the GOTG and the American University will be a contractual arrangement on a cost-reimbursable basis arrived at after a competitive bidding procedure and an in-country review of contractor proposals. All American Title XII Universities, as so designated under the Title XII legislation, will be eligible to submit expressions of interest in bidding on the project. Actual contractor proposals will be received from a short list of eligible university contractors developed by the BIFAD committee.

2. PROCUREMENT PLAN

This plan will outline the scope of the required procurement, the responsibilities of the procuring agency(ies) involved and the steps to be followed in implementing procurement actions.

1. The control of goods and services under this Grant will be the responsibility of the Ministry of Agriculture and Natural Resources of the Government of The Gambia. The Ministry of Agriculture and Natural Resources, upon acceptance of this procurement plan, will designate their official(s) responsible for local procurement and will specify their method of control and/or documentation of such procurement. The Ministry has indicated a preference for procuring goods and services for the project from the U.S. sources to the maximum extent possible and an inability to accomplish this procurement itself in accordance with AID regulations. AID/Banjul, therefore, upon receipt of an official request for U.S. procurement from the Ministry of Agriculture and Natural Resources, will assist the Ministry in locating an acceptable Procurement Services Agent.

2. Procurement Services Agent (PSA): All commodity procurement in the United States for this project will be accomplished through a PSA identified by AID/Banjul and authorized by the Ministry of Agriculture and Natural Resources. The Afro-American Purchasing Center (AAPC) in New York would be the probable PSA. AAPC is currently acting as the PSA for a number of current projects funded through AID/Dakar and the Mission is familiar with their operations and performance. They are fully qualified to serve as the

PSA with regard to this project and have prior AID/ Washington approve to perform this service. AAPC's fee for procurement services is negotiable and will be determined in this case, prior to procurement activities, by the Government of The Gambia, AID/ Banjul, and/or other USG agencies qualified to serve this need.

3. Technical Assistance, Training and Contruction Services: We anticipate that all technical assistance to be provided unde this project will be accomplished through institutional service contracts with the Government of The Gambia, U.S. AID and the selected institution(s) as tri-partite signatories to the contractual agreement. It is anticipated that Project Component # 1 for Land Resources and Use Evaluation, Classification and Cartography will be accomplished through the issuance of two separate contracts for services: First, a contract for aerial photography of The Gambia as specified by Component #1 and a detailed Terms of Reference: and, Second, a contract for photo interpretation, land resource and use classification, cartography, and in-country training of Gambians in photo interpretation and utilization of maps in development planning. All other technical assistance required for Project Components #2 to 6 will be sought through an institutional contract with an American Title XII University and other agencies with prior development experience. It is anticipated that the large majority of professional technical services required will come directly from the selected Title XII institution. AID General Regulations will apply to all these contracts and the selection of the Title XII University will be conducted through the established BIFAD committee procedures. According to AID regulations, the request for proposals from firms, other than the contractual agreement through the Title XII mechanism, will be advertised in the Commerce Business Daily and issued to qualified institutions on the basis of the standard BID evaluation procedure. AID/W will assist in selecting the awardee by the normal selection procedure.

Engagement of all technical assistance will be by Project Implementation Orders/Technical with authority from the Government of The Gambia's representative in the Ministry of Agriculture and Natural Resources. Participant

training programs, as detailed in Annex J., Project Component #6, will be filled by candidates selected by the Government of The Gambia and training will be implemented through Project Implementation Orders/ Participant as issued by AID/Banjul with the approval of the Host Government.

Construction under the project will be advertised for U.S. and local firms. Proposals will be solicited through the Commerce Business Daily for U.S. participation. It is anticipated,however, that U.S. firm interest in construction in The Gambia will be minimal. It is likely, therefore, that actual construction contracts for facilities will be awarded to construction firms licensed to operate in The Gambia. Competitive bidding will be sought through the Government of The Gambia's normal procedures which have been used and determined adequate for other AID-financed projects.

Procurement Sources and Origin: It is expected that all direct procurement of goods and commodities using foreign exchange will be from the United States (Code 000). Under local cost procurement of goods and/or services - as shown in Annex O, Table 3 - approximately 75% of all procurement will be Gambian in source and origin. Shelf item procurement amounts to approximately 10% of Gambian local cost procurement. Code 935 procurement is requested for certain goods - chiefly vehicles and construction materials, as discussed below.

Payments: Payment to the PSA for services rendered will be made by the Direct Letter of Commitment method. Upon receipt of the PIO/C in AID/W (SER/COM/BFD), the Letter is sent to AAPC to initiate procurement. When AAPC has completed its purchasing actions, documents are presented to the AID Controller's Office in New York for payment.

For local payments, procedures established by the Regional AID Controller in Dakar will be followed.

6. Delivery: All commodities ordered and imported into The Gambia will be shipped on the basis of costs, insurance and freight (CIF) to the port of Banjul. The PSA will provide all-risk marine insurance in the amount of 150% of the CIF cost of the commodities. AID's normal marketing requirements for overseas shipments will be carried out bythe PSA.

7. Receipt, Inspection and Utilization: The Grantee is held responsible for the proper reception and port clearance (exonerations) of all in-coming project commodities. Inspections of incoming shipments must be made and receiving documents will be used to comment on damage and/or losses.

Damage/loss reports will be made expeditiously so that claim actions can be effected against the suppliers or carriers. AAPC will act on the behalf of the Grantee if it receives reports regarding shipments from the United States.

The Grantee will be required to submit to AID/Banjul receiving reports of all project-related goods released from the port.

3. SOURCE/ORIGIN WAIVERS

Discussion: As discussed in the body of the procurement plan, the majority of the procurement under the project will be of US and cooperating country source and origin, however, it is essential that allowances be made for Code 935 country procurement for certain components.

1. Vehicles

Vehicles of US manufacture are extremely rare in The Gambia, and are generally used by a few employees of the American Embassy. There are no local dealers for any US-made vehicles and therefore no spare parts, repair manuals or any personnel trained to service American vehicles.

Visits were made to several local vehicle dealers to survey their facilities, capabilities and performance. Those visited included Mercedes-Honda (Autos); Taunus-Land Rover-Toyota (land cruiser only); Bedford-Massey Fergusson (farm tractors); Volkswagen - Honda (Cycles). All of the shops were either clearly inadequate or non-existent except that for VW-Honda (Cycles) which was reasonably well equipped and operating in a normal fashion. They also had a good stock of spare parts for Honda. The Taunus-Land Rover-Toyotadealer had some parts for Taunus only. The Manager told me that he had just started importing Toyota land cruisers because of the price advantage over Land Rover. He

imports parts for the latter two makes on a case-by-case basis from Dakar, Senegal. The shop was severely crowded. The majority of vehicles had evidently been there for some time. Tools, personnel and equipment were also in short supply.

Most of the trucks owned by the GOG are serviced and repaired in government run garages. Those of the Ministry of Agriculture are the responsibility of the Agricultural Mechanical Workshop at Yundum on the outskirts of Banjul. The shop superintendent, Mr. Mamburay, served an apprenticeship and had several years experience in Great Britain. The shop is large and well maintained but could use more hand tools and equipment. Spare parts are stocked in the workshop. They are ordered through local dealers and imported periodically since local dealers' stocks are practically non-existent. Adequate parts for Peugeots are stocked in Senegal and come by road from there. Parts from Britain are normally received within two months by sea.

The fleet consists of 19 sedans and mini-buss of various makes, over a hundred Peugeot 404 pick-up trucks, 40 heavy trucks (20 Bedford), about a hundred Land Rovers, 60 Massey-Fergusson farm tractors, two Caterpillar Crawler Tractors, one Aveling-Barford motor grader, and 150 motorcycles (mostly Honda). Mr Mamburay has been trying to standardize on the principal makes mentioned above but a recent program added a new make, 11 Commer trucks.

Major repairs are all done in this shop but three service and minor repair stations have been established in the interior of the country at Sapu, Kenoi and Basse. This project would set up another minor maintenance unit at YBK and assist in improving the facilities at Yundum.

The UNDP has provided some International Harvester (IH) vehicles for a project in The Gambia. All repair and parts service for these vehicles are to be supplied by CFAO, the agent in Dakar, Senegal. The report of the REDSO/WA Engineer on the CFAO-IL facilities in April, 1978, indicates that this maintenance capacity is totally inadequate for IH utility vehicles (Scout) and trucks and only marginal for construction equipment.

The attached memo, dated July 19, is the result of a site inspection made by the REDSO/WA Procurement Specialist. It indicates that IH is still not in a position to support their equipment in Mali another country adjacent to Senegal. It is not realistic to expect that CFAO-IH will develop an adequate support capability to support a much smaller fleet in The Gambia in the near future.

In light of the above discussion of service, maintenance and repair facilities in The Gambia, the potential for improvement and the Minsitry of Agriculture's attempt to standardize on a limited number of makes and models, it is requested that a waiver be granted for proprietary procurement of the following items with their related attachments and initial spare parts from Code 935 sources.

Vehicle Description	Source	Qty	Value Delivered Banjul
A. Land Rover, 4-wheel drive, all terrain vehicles with long-wheel base @ $18,000 each POE	Great Britain	6	$108,000
B. Land Rover 4-wheel drive, all terrain vehicles with short-wheel base @ $13,000 each POE		3	39,000
C. Bedford* 7 ton, all terrain trucks @ $25,000 POE		2	50,000
D. Bedford* 22-passenger bus @ $25,000 POE		1	25,000
E. Honda 50cc all terrain motorbikes @ $600 POE	Japan	54	32,400
F. Honda 120cc all terrain motorcycles @ $1,200 POE	Japan	20	24,000
G. Massey-Fergusson Mod. 165 tractors 3 point hitch and draw bar @ $20,000 POE	Great Britain	3	60,000
H. Massey-Fergusson double disc harrows @ $5,000 POE	Great Britain	3 units	15,000
I. Honda Motorbike repair kits @ $50 POE	Japan	54 sets	2,700
J. Honda motorcycle repair kits @ $100 POE	Japan	20 sets	2,000

* Bedford is produced by a wholly owned subsidiary of General Motors Corp., USA.

2. Construction Components

A code 935 source and origin waiver is requested for fittings, metal door and window frames, plumbing emergency generator and electrical items to be used in the construction of the new houses (5) in Banjul.

The only competent and reliable construction contractor in the country is Balfour Beatty Ltd., a British concern licensed to operate in The Gambia. They maintain a stock of some commonly used items but would have to import more to construct the buildings required. Their normal source of supply is Great Britain. The total value to be procured is estimated at $57,000.

3. Shelf Items

Because of the very small volume of business in this very small country, the quantity and selection of shelf items is very limited. The majority of manufactured items sold locally are imported to order from Senegal. Under Code 941, Senegal is included as a procurement source on the same basis as The Gambia for shelf items.

VI. EVALUATION PLAN FOR THE PROJECT

There are two levels of evaluation contained within this project. The first is the evaluation activities of the project socio-economic unit which will be carried out over the life of the project in the continuous effort to formulate and thoroughly test various agricultural interventions under the project. The second is the formal project evaluation by a team of specialists external to the project. This formal evaluation is scheduled at approximately the end of the thirty-sixth month of project implementation. It is anticipated that the team of specialists for the evaluation will, at a minimum, be composed of an agricultural economist, a rural sociologist, an animal scientist, an agronomist, and a specialist in range and resource management. The team should be able to complete the field evaluation in approximately one month.

It is anticipated that, by the time of the formal evaluation, the socio-economic unit will be in a position to substantially contribute to the team's work by providing numerous field reports on project activities to date and background data to allow quantitiative measurement of project success.

The goal of the evaluation is to provide an assessment of project

progress to date in The Gambia, to evaluate problems surfaced in project implementation, to fully note and describe variations between project design and actual field implementation and, finally, to make firm recommendations for the second five-year phase of the project. These recommendations will include possible changes in the structure and implementation of the existing project through its last two years of life as well as concrete suggestions to the AID office in Banjul as to the direction of the project design in the second phase.

The total budget for the formal evaluation team is estimated at $60,000. End products of the evaluation will be a complete review of the project activities through project year 3, a complete plan for project implementation through the end of project year 5, and a complete list of suggested design directions for the second phase of the project.

VII. CONDITIONS, COVENANTS AND NEGOTIATING STUTUS

Covenants

1. The GOTG will evaluate and approve final job descriptions for all positions proposed for this project under Annex Q. of the project paper and, to the extent that said approved positions cannot be immediately filled with qualified local technicians, the GOTG will make formal application to the Peace Corps Director/ Banjul for Peace Corps Volunteer assistance.

2. The GOTG, in collaboration with AID as represented by the project manager and chief of party, will review at regular intervals all policies relating to pricing of agricultural inputs and outputs as they directly affect activities envisaged under this project.

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635-0203

GAMBIA

MIXED FARMING + RESOURCE MANAGEMENT

Project Paper

Annexes

A - N

Part II of III

PROJECT PAPER (ANNEXES)

GAMBIA MIXED FARMING AND RESOURCE MANAGEMENT PROJECT 635-0203

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON, D.C. 20523

Approved July 19, 1979

UNCLASSIFIED

ANNEX A

LOGICAL FRAMEWORK FOR THE PROJECT

AID 1020-2010-79

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project: From FY 1979 to FY 1983
Total U. S. Funding
Date Prepared: 31 July 1978

Project Title & Number: Gambia Mixed Farming and Resource Management Project (635-0203) - PROJECT COMPONENT #1

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: To increase the economic well-being of the rural people of The Gambia	Measures of Goal Achievement: Formulation of a land use policy to meet future resources needs of The Gambia	Statements and policy papers prepared by the Ministry of Agriculture and Natural Resources for the Parliament and the Government	Assumptions for achieving goal targets: Reduction of conflict between crop and livestock enterprises is possible. Participatory processes at the community level to resolve allocations of crop and grazing lands between villages take place.
Project Purpose: Provide a base for developing land use policy through the mapping of existing land use on recent aerial photos and publishing as a series of multicolor maps at a scale of 1:25,000.	Conditions that will indicate purpose has been achieved: End of project status. Permanently delineated cultivated, grazing and forest areas with appropriate land use policy statements flowing from the completed map series.	Aerial photo sets, completed photo interpretation of existing land use patterns, completed map series.	Assumptions for achieving purpose: The Government District Chiefs and village leaders are willing to formulate and implement a national land use planning process.
Outputs: Aerial photos, land use maps, training Gambian personnel in use of aerial photos, and photo interpretation training package.	Magnitude of Outputs: A complete set of aerial photos for The Gambia at 1:25,000 scale. A complete published set of multicolor multitree land use maps. Ministry will have 8-10 people capable of interpreting aerial photos and doing simple mapping. Complete program for training Ministry personnel in all aspects of map work will be available for incountry training classes.	Physical existence of photos, maps and training materials with trained personnel in the Ministry of Agriculture and Natural Resources.	Assumptions for achieving outputs: The materials produced are actually used in the resource planning and allocation process.
Inputs: Funding, contract services, training personnel and training materials	Implementation Target (Type and Quantity) Aerial photos funding at $340,000 Contract photo interpretation services, cartography and training at $449,000.	Existence of photos, maps and training materials.	Assumptions for providing inputs: Aerial photos can be produced by the second year of the project. Other on-going and planned projects need and will make full use of the photos and maps provided.

BEST AVAILABLE DOCUMENT

AID 1020-1011-720

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 1979 to FY 1983
Total U. S. Funding
Date Prepared: 11 July 1978

Project Title & Number: Gambia Mixed Farming and Resource Management Project (635-0203) - Project Component #2

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: To increase the economic well-being of the rural people of The Gambia.	Measures of Goal Achievement: Improvement of the quality and quantity of the grazing land in The Gambia.	Improvement of production in the national livestock herd.	Assumptions for achieving goal targets: Sufficient desire to improve grazing resources exists from village level to the Ministry. An adequate marketing outlet is provided for all livestock flowing from the improved production schemes.
Project Purpose: Necessary field research will be carried out to facilitate land use planning, establish demonstration areas, and formulate educational programs for rural people.	Conditions that will indicate purpose has been achieved: End of project status. A cadre of range management assistants will be sufficiently trained to continue the development of grazing lands management schemes. An adequate natural resource data base will be in existence for development of grazing management strategies on natural grazing and fallow crop lands	A trend toward improvement of grazing lands and, therefore, improvement of livestock production has been established.	Assumptions for achieving purpose: The attitudes, goals and desires of livestock owners and herders reflect a willingness to seek improved grazing conditions for their livestock.
Outputs: Physical development of grazing areas, base line inventory of existing plant communities, grazing land management and forage production trials, brush fire reduction program, establishment of year-long forage planning, natural resources planning support, training and technical training of personnel, and management of grazing resources.	Magnitude of Outputs: 40-60 deep wells developed in four years; dappo boundaries at least 90% marked; ecological inventory at least 40% complete including plant collection; 200 forage yield transects established; four 10 acre study plots established in each of 3 ecological zones with two years of data collected and completed study design developed; observational tours implemented; education programs on brush fire control, forage and feed availabilities, village-level planning and resource allocation established; educational materials developed.	Physical developments measured through spotchecks. Inventory and assessments measured through project reports and data base files. Grazing management trials verified through field observations and inspection of raw data filed. Brush fire reduction through program materials and spot checks. Training and technical teaching through training syllabi, materials produced and number of people trained.	Assumptions for achieving outputs: An adequate data base can be developed in a short enough period to allow the project to the grazing lands planning phase.
Inputs: U.S. long-term personnel (AID and PCV). Construction materials. Field study and inventory equipment. Vehicles. Training materials.	Implementation Target (Type and Quantity) U.S. long-term personnel at $990,000. Construction materials at $ [illegible],000. Field equipment at $[illegible],000. Vehicles at $68,000. Operating expenses at $44,000	Physical inventories, project files, AID records, and field spot checks.	Assumptions for providing inputs: Materials and field transport will be available when the phases are ready to start.

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AID 1020-F-10-78

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 1979 to FY 1983
Total U. S. Funding
Date Prepared: 31 July 1978

Project Title & Number: Gambia Mixed Farming and Resources Management Project (635-0203) - Project Component #3

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: To increase the economic well-being of the rural people of The Gambia.	Measures of Goal Achievement: Increased herbage available for dry season grazing by livestock. More effective utilization of fallow land through improved grass/legume species. Direct economic benefits from improved fallow utilization. Adoption of improved agronomic practices and maize cultivars by farmers. Higher yields of maize as a food and feed crop by collaborating farmers.	Field survey results, project files, analyzed data from the socio-economic unit of the project.	Assumptions for achieving goal targets: Increased feed supply during the dry seas is the foundation of any improved livesto industry in The Gambia. Improvement of crop and livestock enterprises of farms remains a high priority of the GOTG. Proven technological packages of maize a forage production can be developed under the project. Market conditions will sustain increased livestock and crops production.
Project Purpose: Develop a technological package for improved production and management of forage species. Develop a technological package for maize production and utilization. Establish these programs within the Gambian farming systems.	Conditions that will indicate purpose has been achieved: End of project status. Packages will be designed, tested and extended to collaborating farmers. Ministry will have developed an adequate delivery system for the programs.	Project records, Ministry program evaluations, data analyses by the socio-economic unit of the project, field visits.	Assumptions for achieving purpose: Technological packages are developable o Phase I of the project. Farm testing proves the economic and social viability of packages to farmers. Farmers will accept the packages for adoption and Ministry will develop an increased suppor capacity for the programs.
Outputs: Trained local specialists in forage and maize production and management. Develope technological packages for forage and maize production within Gambian farming systems. Local seed production and evaluation capacity within the Ministry. Increased Ministry extension support capacity for forage and maize programs.	Magnitude of Outputs: Printed extension guidelines and training materials for maize and forage. Established evaluational grazing trials. 15-20 on-farm tests of forage production packages. 4-5 officers and 5-6 Assistants trained in forage production and management. Local production of sufficient seed to support the extension program.	Visits to experimental trials, seed production records, yield data for forage and maize trials, project records and Ministry personnel rolls.	Assumptions for achieving outputs: Technical capability for carrying out agronomic trials exists under the projec On-farm demonstrations result in farmer adoption of the technological packages. Ministry personnel are trained and support the interventions.
Inputs: U.S. long-term specialists for eight person-years. Short-term consultants and ICVs. Participant and local training for Gambian technicians. Commodities and equipment.	Implementation Target (Type and Quantity) U.S. long-term specialists at $720,000 Consultants at $120,000. Participant training covered elsewhere. Commodities and equipment at $399,000	AID Controller records, project records and progress reports, and Ministry budget and reports.	Assumptions for providing inputs: Ministry assigns quantity and quality o staff needed to the project. Supplies, commodities and equipment can be scheduled, purchased and delivered on a timely basis. Ministry will provide all necessary and complementary inputs.

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AID 1020-25(11-70)

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project:
From FY 1979 to FY 1983
Total U. S. Funding
Date Prepared: 31 July 1978

Project Title & Number: Gambia Mixed Farming and Resources Management Project (635-0203) - Project Component #4

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: To increase the economic well-being of the rural people of The Gambia	Measures of Goal Achievement: Adoption of techniques to utilize crop residues for dry season feeding; adoption of methods of harvest and preservation of crop residues; adoption of techniques to utilize animal manures; adoption of methods of farm transport to improve efficiency of farm labor and general farm operations; LOA members recognize services provided and request assistance.	Field observations by specialists; number of requests by farmers for loans; national production estimates; observations by Extension Assistants; increased participation in Gambian Cooperative Union; increased membership in LOAs.	Assumptions for achieving goal targets: Farmer demand for animal-drawn transport remains high; increased feeding of livestock during dry season will accrue recognized results; improved distribution of manures will increase crop yields; LOA members will be responsive to use of credit.
Project Purpose: Establish revolving fund of credit to expand use of carts on farms; develop technology for improved livestock traction methods; train Gambians in the value and use of credit; train Gambians in efficient use of mixed farm resources.	Conditions that will indicate purpose has been achieved: End of project status. Unit under Gambian control comprised of effective extension specialists; training aids for use in extension programs; source of plans for farmer construction of storage facilities; appropriate training courses on feeding of draft animals; availability of improved ox carts and credit for purchase.	Department of Animal Health & Production budget changes; socio-economic unit evaluation of activities; technical review by economist and animal scientist; interviews with Livestock Officers.	Assumptions for achieving purpose: Department of Animal Health & Production will provide adequate policy direction, budgetary support and coordination to enable program to operate; Cooperative Union will provide adequate administrative supervision to insure operation of the credit program; LOA members will respond to on-farm demonstrations; LOA members will use credit.
Outputs: Improved efficiency of farm operations; improved feeding of livestock; value of increased capital investment to enhance productivity; trained Gambians in the value of quality of foodstuffs for animals; the expanded use of mechanization, and the use of manures for fertilizer in maize production; demonstrated value of frame on cart for improved efficiency of transport.	Magnitude of Outputs: 30 LOAs assisted with action program; trained extension agents in 30 Districts; 300 LOA members trained in improved cart system;	Visits to cooperating LOAs to evaluate acceptance by farmers; feedback and records from Credit Union; project records; feedback from field Extension agents.	Assumptions for achieving outputs: Technical capability for carrying out on-farm demonstations will exist among local staff; Gambian Cooperative Union will continue to expand its activities as a service agency; Livestock Owner Associations will become a fully effective organization through which government can execute programs affecting mixed farming activities; Livestock Assistants will find the improved technology a useful addition to their skills.
Inputs: Local training; credit fund for purchase of carts; short-term expatriate in engineering to develop farm technology on crop storage; commodities and miscellaneous supplies.	Implementation Target (Type and Quantity) One agricultural engineer for 2 months, $20,000; one Gambian trained abroad for 4 months; local in-service training; credit fund $250,000; commodities $5,000; fund for construction on farms ($12,000).	AID Controller records; project records and progress reports; Cooperative Union records and reports.	Assumptions for providing inputs: Department of Animal Health & Production will assign quality personnel to the Cart program; Carts can be made available to LOAs on a timely basis; Credit Union will assign quality personnel to handle issuance of loans and repayments; Department of Animal Health & Production & Division of Engineering of the Department of Agriculture will provide complementary inputs (maintenance and support).

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AID 1020-0101-720

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project: From FY 1979 to FY 1983
Total U.S. Funding
Date Prepared: 31 July 1978

Project Title & Number: Gambia Mixed Farming and Resource Management Project (635-0203) - Project Component #

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: To increase the economic well-being of the rural people of The Gambia.	Measures of Goal Achievement: Provide a rational and systematic means of seeking ways to increase the economic well-being of rural people through modification of existing farming systems.	Survey reports, project records, socio-economic data from the project unit and the GOTG.	Assumptions for achieving goal targets: That the GOTG has the desire and means to create policies and the necessary institutions to ensure the increased well being of rural people.
Project Purpose: To provide baseline data, a testing scheme and a structured feedback mechanism to ensure the achievement of objectives of the project and to establish a functional institution for micro-oriented socio-economic work within the Ministry.	Conditions that will indicate purpose has been achieved: End of project status. The economic well-being of rural people has been improved. The socio-economic component can play a significant ex ante role in the development of relevant technology and implementation strategies for agricultural enterprises on Gambian farms. There is a functioning Gambian micro-oriented planning unit in the Ministry at the end of the project.	Using survey techniques to describe the existing situation, to test the relevance of proposed technological packages, to help develop relevant implementation strategies, to monitor developments, and to measure the impact.	Assumptions for achieving purpose: That technology can be developed and institutions created that will ensure the increased level of economic well being desired for rural producers
Outputs: Baseline survey, in-depth survey, testing and developing relevant technologies, market survey, LOA study, monitoring analyses, project analysis from the collected data, and training of local specialists.	Magnitude of Outputs: Two single interview large sample surveys; twice weekly over a four year period of a small sample of farmers; special subject studies plus an in-depth testing of project interventions; two MS ag economists trained; one MS rural sociologist trained; 25 trained field enumerators	Project files, survey reports, data files, unit analyses.	Assumptions for achieving outputs: That the survey results will provide an adequate data base for project activities That funds for incorporating the trained Gambians into the Ministry will be forth coming at the end of the project.
Inputs: U.S. long-term specialists Short-term consultants and PCVs. Participant training. Equipment and vehicles. Training materials.	Implementation Target (Type and Quantity) Two US specialists for ten person-years at $900,000. Consultants at $130,000. Participant training as enumerated elsewhere. Equipment and vehicles at $187,000. Operating costs at $230,000.	AID controller records, project files and inventories, Ministry employment rolls and budgets.	Assumptions for providing inputs: That personnel, vehicles, equipment and materials are available at the time and in the quantities necessary for proper project phasing.

BEST AVAILABLE DOCUMENT

AID 1020-0010-72D

PROJECT DESIGN SUMMARY
LOGICAL FRAMEWORK

Life of Project: From FY 1979 to FY 1983
Total U.S. Funding
Date Prepared: 31 July 1978

Project Title & Number: Gambia Mixed Farming and Resource Management Project (635-0203) - Project Component #6

NARRATIVE SUMMARY	OBJECTIVELY VERIFIABLE INDICATORS	MEANS OF VERIFICATION	IMPORTANT ASSUMPTIONS
Program or Sector Goal: The broader objective to which this project contributes: To increase the economic well-being of the rural people of The Gambia.	Measures of Goal Achievement: Improvement of the quality and quantity of trained Gambians within the Animal Health and Production Department and the number of extension services offered farmers, particularly those in Livestock Owners' Associations.	Ministry and project files, field surveys.	Assumptions for achieving goal targets: Training remains a priority of GOTG. Extension services and the use of communications support materials remain a key GOTG strategy for rural development.
Project Purpose: Build up GOTG's training capability. Improve outreach program for Gambian farmers. Build up GOTG's capacity to provide effective extension services to farmers.	Conditions that will indicate purpose has been achieved: End of project status. Increased numbers of trained high-level livestock officers; improved training centers, syllabi, materials; increased number of farmers exposed to project demonstrations; farmers reached more regularly; increase in livestock production models shown to farmers; increase in livestock production models followed by farmers.	Physical inventory Interviews with farmers Observation of farmer behavior Ministry files	Assumptions for achieving purpose: Livestock Owners' Associations continue to function. Up-country livestock training center is firmly established and fully staffed. Collaboration between Agriculture Departments and Information Ministry is forthcoming. Transportation to demonstration field sites and to training centers is assured. Candidates are found for participant training.
Outputs: Trained middle-level Ministry officials Trained lower-level Gambian laborers and machine workers. Farmer exposure to model agricultural and livestock practices. Initiated training and communications staff. LOAs direct access to radio broadcasts Taped information, discussion feedback Farmers view new films on livestock New graphic materials for extension and training.	Magnitude of Outputs: 13 trained middle-level Ministry officials after 6 months - 2 yrs. in US or Africa, by 1984. 20 trained lower-level Gambian laborers and machine workers to support project activities, by 1980. 20 Gambian farmers having returned to their villages after an observational tour to an African country. 50 Gambian officials initiated to training and communications strategies during 8 workshops.	on-the-job performance of trainees after, return. Physical inventory Observation and interviews in the field. Attendance list at workshops AID records PC records Ministry or project files	Assumptions for achieving outputs: Trainees are found, complete training, return to work for Ministry. GOTG can finance its counterpart contribution. Gambian farmers can relate to another country's agriculture and livestock situation; training will take place during the tour; observations will be shared among villagers. U.S. technicians will make time for training and extension activities. PCVs can be found, trained, and will work effectively with counterparts and US long-term technicians.
Inputs: Participant training Local training for Gambians Peace Corps Volunteers Workshops Media hardware and training materials Vehicles Rehabilitation and construction of training center. U.S. long-term specialists Observational tour for farmers	Implementation Target (Type and Quantity) Participant training at $225,000 Local training for Gambians at Gambian expense. Workshops at $35,000 Media hardware and training materials at $ 23,000 Vehicles at $30,000 U.S. long-term specialists performing training role budgeted elsewhere.	Physical inventory AID records Peace Corps records Field spot interviews Project files	Assumptions for providing inputs: Gambian trainees available. GOTG assures its counterpart financing. PCVs trained and arrive on time. Hardware arrive in good functioning order and is well maintained. U.S. technicians will make time for training and extension.

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ANNEX H

THE AGRICULTURAL SECTOR OF THE GAMBIAN ECONOMY AND GOVERNMENT POLICIES FOR RURAL DEVELOPMENT IN THE GAMBIA

SECTIONS:

A. CROP PRODUCTION

B. LIVESTOCK PRODUCTION

C. FORESTRY

D. LAND RESOURCE AND USE EVALUATION, CLASSIFICATION AND CARTOGRAPHY

ANNEX H - SECTION A

CROP PRODUCTION

Annex G. The Agricultural Sector of The Gambian Economy and Government Policies for Rural Development in The Gambia

1. Crop Production (Present Situation)

A. Production, Area and Yields

The first National Plan for The Gambia (Five Year Plan for Economic and Social Development, 1975/76-79/80) set a goal of substantial rural development. Priority was given to stimulating local cereal production, to eliminate bulk imports (particularly rice) by 1980 and to diversify rural cash income away from groundnuts (peanuts). The central strategy was the coordination and integration of extension efforts in agriculture, animal husbandry and cooperatives.

Agriculture is clearly the most important sector of The Gambian economy, with particular emphasis on the export market. Groundnuts occupy about 59 percent of the total cropped area. The principal food crops consist of millet (Pennisetum americana, syn. P. typhoides), early and late types occupying about 15 percent; rice (Oryza sativa); rainfed and irrigated about 13 percent; sorghum (Sorghum vulgare), 7 percent; maize (Zea mays), most of which is eaten green, and hungry rice (also called "findo" or "funio", Digitaria exilis), both occupying about 5 percent (Table A), along with groundnuts. Average yields of both cereal crops and groundnuts are quite low. Little chemical fertilizer is used except for groundnuts, along with rice and cotton grown in specific projects.

TABLE A

Acreage and Average Yields of Principal Crops
(1974)

	Area* ('000/ha)	Percent of Total* Cropped Area	Avg. Yields** (kg/ha)
Groundnut	91.5	59	800-1200
Millet-early and late	23.9	15	600-1500
Rice-rainfed	18.4	12	900-1500
Rice-irrigated	1.3	1	2000-3000
Sorghum	10.7	7	800-1200
Maize	6.6	4	400-800
Findo (Digitaria)	2.8	2	200-500
Total	155.2	100%	

Source: *Central Statistics Division, President's Office, Banjul
**Consultation with members of the Department of Agriculture

According to an Overseas Development Ministry (ODM) Land Resource Survey, the total land use of The Gambia comprises 1,036,483 hectares (2,561,149 acres). A classification of land use showed that 46 percent of the soil groups fell into unsuitable and marginal categories. Still, a portion of these groups is cultivated (Table B). A high percentage of the suitable soil groups were being cultivated or in fallow in 1972

when the survey was made. The proportion of total cultivated to fallow land was one to three at that time. Percent estimates indicate that land under cultivation is continuously encroaching onto grazing and forest lands.

TABLE B

Land Use in 1972 in Relat n to Soil Groups

Land Use Categories as a Percent of Soil Group

Soil Group	Cultivated	Fallow	Uncultivated	Non-agric	Total
1. Unsuitable	2	16	78	3	100
2. Marginal	4	31	64	1	100
3. Suitable w/ qualifications	18	47	33	2	100
4. Suitable (rainfed crops)	26	58	13	3	100
5. Suitable and irrigable	7	24	68	1	100

Source: Dunsmore, J. R. et al. "Recommendations for Agricultural Development in The Gambia." Ministry of Overseas Development, London: 1975, Land Resources Division.

The five Government (regional) Divisions show major variations in potential for land use (Table C). About half of the Lower River Division is unsuitable for agriculture, having saline and acid soils. McCarthy Island and North Bank Divisions have the highest proportions of land with good potential.

TABLE C

Soil Groups by Division

Percentage of Divisional Totals

Division	Western	Low. Riv.	No. Bank	McCarthy Island		Upper River		% of Soil Grps.
Soil Group				N	S	N	S	
1. Unsuitable	18	52	37	35	28	38	34	34
2. Marginal	15	12	7	21	11	15	7	12
3. Suitable w/ qualifications	22	14	14	6	17	12	12	14
4. Suitable (rainfed crops)	32	19	37	20	16	15	25	25
5. Suitable and irrigable	13	4	5	17	29	19	23	14
Totals	17	15	21	14	14	9	10	100

Source: J. R. Dunsmore et al., op. cit.

In the 1974 Pilot National Survey of Agriculture, it was estimated that 15 percent of the total land area in The Gambia was being cropped. Of this, almost 60 percent was planted with groundnuts. Significant regional differences existed. Almost one-third of the groundnut land area occurred in the North Bank Division. Over two-thirds of the irrigated rice and one-third of the sorghum area was found in the Upper River and McCarthy Island Regions. Significant amounts of millet have always been grown throughout the country, with the North Bank and Western Divisions having the largest land area devoted to these crops. Maize is grown as a field crop on a small scale in the two easternmost Divisions and "findo" mainly in the North Bank Division.

Crops are produced in The Gambia entirely by individual family units. There are no estate, land settlement or cooperative farms. Over 95 percent of all small farming units ("dabadas") grow groundnuts with an average of 2.63 ha per unit. Millet is grown by about 60 percent of all farm units and sorghum on less than one-half of the units (average of about 1.0 ha of each crop per unit). Both millet and sorghum are occasionally intercropped with groundnuts but more often are grown as pure stands, especially in fields located close to the compound. About one-half the units grow swamp rice. Maize as a foodcrop (roasting ears) is mainly grown close to the compound, often in mixture with cassava, while "findo" is grown in more distant fields.

Production of the principal food crops is listed in Table D. Three estimates are shown for the 1974/75 crop year to illustrate the variability of the available statistics. To estimate the total available domestic food supply, maize and "findo" projections were included in the totals. Available domestic food increased slightly between 1973/74 and 1974/75, and dropped in 1975/76.

Rice imports increased over the period and were projected to approach 35,000 tons in 1976/77. Up to April, 1976 a substantial price differential existed between Senegal and The Gambia. It was assumed that half the imported rice was re-exported to Senegal. Food aid reached 12,000 tons during the Sahelian drought and since then has declined substantially.

Normal conversion ratios applied to the cereal crop production figures show a per capita intake of cereals for 1973/74 of 136 kg. With an increasing population of 2.8 percent per annum and a decreasing stable food production, per capita staple food crop consumption may have declined. Per capita consumption of cereals probably falls below desirable levels during the "hungry season" (June-August).

TABLE D

Food Grain Production and Imported by Crop 1973-76

('000 metric tons)

Sources*	1973/74 1	1974/75 2	1974/75 3	1974/75 4	1975/76 5
Crop					
Millet	21.5	20.8	25.5	30.3	19.5
Sorghum	8.3	8.3	14.6	12.1	11.3
Maize	11.4	-	8.2	-	3.7
Rice	24.0	28.5	21.8	18.9	19.1
Findo	1.3	1.7	1.6		1.6
TOTAL DOMESTIC	66.5	59.3	71.7	61.3	55.2
Rice-Imported	14.9	17.9	17.9	17.9	22.7
-Consumed	(7.5)	(8.9)	(8.9)	(8.9)	(11.4)
Food Aid	10.9	1.7	1.7	1.7	2.7
TOTAL AVAIL.	84.9	69.9	82.3	71.9	69.3
Population (000's)	493.5	507.3	507.3	507.3	521.5

rces:

1. FAO/World Bank Cooperative Programme, Draft Report of The Gambia Agricultural Development Project. Agriculture Vol. 1, Annex 1, pg. 14.

2. J. D. Winter and G. A. Gilman. R477 from 1974/75 Prov. Agr. Sample Survey. Tropical Products Institute, ODM. Report of the Grain Storage/Marketing Evaluation Mission to The Gambia, June, 1975.

3,5 The Gambia Central Bank Annual Report Part II. Review of Developments in The Gambian Economy, pg. 4.

4. J. R. Dunsmore, et al. Vol. 1, Sec. C, pg. 7, 9/Ministry of Overseas Development; Land Resources of The Gambia and Their Development.

2. Traditional Production Systems

Land tenure in the rural areas is governed by customary laws involving communal rights. The headman in each village allocates land use rights to compound heads. Land allocations may be altered by the headman if compound size changes dramatically. Leases for specific purposes, such as growing irrigated rice, may be granted by the district authority. The present situation allows flexibility for adjustment to changing social and demographic pressures. Land disputes arise over matters such as livestock owners' rights to move animals through cultivated areas to watering spots, but are usually settled by village headmen.

The care of specific crops tends to be confined to one sex. Groundnuts are traditionally tended by males. Swamp rice is tended by women. Women also tend to do the major share of upland rice cultivation. The crops introduced more recently, such as irrigated rice and cotton, are cultivated by both. Males tend to do more of the heavy work, such as ground breaking for upland crops, and women assist in weeding and harvesting.

Cultivation practices vary but in upland areas seedings are made on the flat and in ridges. Some animal manure is utilized, particularly on areas used for food crops close to the compound. On more distant fields, a crop rotation is followed.

Most cultivation is carried out by using traditional hand methods with the hoe as the primary implement. Since 1955 the government has encouraged the use of animal traction with moderate success. Until recently the Mixed Farming Centers (MFC) provided residential ox-training. Now this function is carried on in the villages, and the MFC's serve as the central focus for the area agricultural extension program. Census data show the number of mature work oxen in The Gambia to be over 15,000 or about 6,500 pairs of oxen available to about 24,000 farming compounds. No figures are available on the land area cultivated with animal traction.

The adoption of animal traction has been slow. Initially the equipment was not suited to Gambian conditions. It was too heavy for the local N'Dama cattle and unsuitable for local soil conditions. Now, the equipment is purchased from Senegal and judged to be suitable, but prices escalated to an estimated D2,000 for a complete package of agricultural implements in 1978, including a pair of oxen which cost D750.00 to D.1,000.

Subsidization of agricultural implements by the GOTG is carried out by waiving import duties and transport costs from Dakar. Recent provision of medium-term credit from the Cooperative Societies enabled farmers to get loans for implements. A greater percentage of oxen are in the two easternmost divisions. Farmers there stated that sometimes they purchased used equipment from Senegalese farmers, who can obtain implements at a higher rate of subsidy and under better credit terms.

According to Lowe[1], use of the ox plough has increased the land use for groundnut cultivation by 18 percent, while food crop acreage remained stable. Although ownership of oxen increased the land to labor ratio, the entire available farm labor resource is used during July, the peak labor period. The potential for increased cash crop productivity is limited, however, unless a way can be found to break the peak labor constraint.

Some increase in productivity of Gambian land and labor resulted from the use of animal traction. Thus, use of the ox plough is part of the improved crop production programs for groundnuts, cotton and sorghum in the three western Divisions. These programs are funded by the World Bank Consortium. The recent price increases for oxen and animal-drawn

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[1]Dunsmore, et al; op cit.

implements, however, raise questions about the economic returns from animal traction. Higher producer prices for groundnuts could result in a higher gross margin for ox-owning compounds, but the major constraint may be labor availability for hand weeding during July. A comparison of traditional farming systems with groundnuts to that of an improved scheme using oxen for land preparation, planting and weeding, and an improved scheme with manual cultivation practices showed similar gross returns per-man-day.[1]

3. Crops, Culture and Practices[2]

A. Groundnut (Arachis hypogaea)

Groundnuts are the only major cash crop in The Gambia, the oilseed type predominating. They are grown throughout the country for sale (unshelled) to the Gambian Produce Marketing Board and for human consumption. Satisfactory yields can be obtained with minimum cultivation such as harrowing and hoeing where ground cover is limited. Most planting is done by dibbling (hand planting) but the use of animal drawn seeders has increased in recent years. Hand labor continues to be the most common means of weeding, with animal-drawn implements being used to a limited extent. Herbicides have shown promise in experimental trials but the economics of such a practice are unattractive.

An erect-growing oilseed cultivar developed in Senegal, predominates in the western part of the country and a spreading type, GOMB cultivar, prevails in the eastern areas. Introduced types have shown potential in small plot trials on the agricultural experimental stations but have not been accepted by farmers. Seeds are saved by farmers but are not carefully selected or treated with a fungicide.

Many farmers use fertilizer for groundnuts. The present recommendation is 112 kg/ha of single superphosphate (8.8 kg of phosphorus) applied at the time of first weeding, 10 days after sowing. Farmers believe that a pre-planting application increases weed growth. Studies have shown that the 10-day post-planting application does not reduce yields.

Harvesting is accomplished by lifting the plants from the soil, either by hand-pulling or use of a forked implement, laying the plants to dry in the field, placing in stacks throughout the field and threshing by flailing or use of a manually operated implement. The vines (haulms) are widely used as cattle feed during the dry season, being fed as hay or left in the field to be eaten by cattle. Most of the leaves have been lost during drying, stacking, threshing and subsequent handling so that feed quality is extremely low.

The Department of Agriculture has demonstrated that grading of seed, treating seed with a fungicide, correct plant population (90,000 plants per ha), timely weeding and fertilizing can increase yields by 25 percent. Quality of kernels and hay could be improved by more appropriate systems of lifting and threshing.

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[1] Lowe, G.D.N. The Land Areas of The Gambia and Their Development. Vol. 3 Rural Society and the Economics of Agricultural Development, Ministry of Overseas Development, London, 1975.

[2] More detailed descriptions of a larger number of crops are given in Dunsmore, J. R., et al. op cit.

Confectionery-type groundnuts are grown in the western Division but on a limited scale. In 1977 from 800 to 1,000 ha were grown by members of cooperative societies under guidance of the Department of Agriculture and by small holders producing for an agent of the Marketing Board. The bulk of the crop is composed of the small-kerneled cultivar Philippine Pink.

Groundnut cake, a by-product of oil extraction, is mainly exported with a small proportion used in prepared feed rations. It represents, however, a potential source of high-protein feedstuff for cattle fattening within the country.

B. Cotton (Gossypium hirsutum var. latifolium)

Cotton has been grown in The Gambia for years but on a limited scale. An experimental program and a pilot extension project to increase production as a cash crop was undertaken by the Department of Agriculture in 1969. It is estimated that some 1000 ha are presently cultivated. A ginnery located in Basse may result in increased production. Yield data are based on the quantities of seed cotton sold to the Government, but may be low because of an amount retained for home use or local sale. It is estimated that yields of seed cotton range from 600 to 850 kg/ha but with improved cultivars and agronomic practices they can approach 1,100 kg/ha. Ginning percentage range from 36 to 38. The seeds constitute a potential source of cattle feed and, in fact, are sometimes fed without further processing.

C. Bulrush Millet

Millets comprise one of the major food cereals and do not enter the market. They are mainly grown in pure stands near the village on land manured by tethered cattle in the dry season, or sometimes mixed with groundnuts in areas more distant from the compound. Early and late types are usually planted after the onset of rains, even though the Department of Agriculture recommends that early maturing types be planted in dry soil before the rains begin. The millets usually follow groundnuts or cotton in the rotational scheme so that limited land preparation is needed. Planting is made on the flat or on ridges and seeds are sown by hand or animal-drawn implement. Commercial fertilizer is not applied to millet.

The local types have not been described or classified. They are recognized as early forms, "Suna" (about 95 days to maturity) and late forms, "Sanyo" (up to 150 days). The early forms are day-neutral and the late forms are photosensitive with a higher plant residue: grain ratio (5 to 7:1) and a higher potential grain yield (up to 2800 kg/ha compared to 1800 kg/ha for the early types). Trials with improved cultivars from other countries have been carried out but those suitable for The Gambia have not been identified.

Grains are harvested by cutting the seed heads, carrying to the compound in a basket and threshing by flailing. They are stored within the compound. The stalks and leaves are usually left in the field and grazed as residue. They may also be used as fencing material to surround the compound.

D. Sorghum

This crop comprises the other major cereal eaten in The Gambia. Cultivation practices are similar to those of millet. Cultivars currently used belong to the so-called Guinea "race" and have a maturation period of 90 to 150 days, mostly between 120 and 130 days. All are tall (up to 4.0 m) and have open, loose and pendulous panicles, and small seeds. The seeds possess a thin mesocarp, a white pericarp (except in the western Division where it is red) and the testa is not colored in the mature grain. All types are photosensitive and produce flowers with the shorter days of September, or about the end of the rainy season. Studies of local types compared to introduced cultivars have not identified forms suitable to The Gambia. Farmers save their own seeds from year to year. Harvesting and storing of grain and use of residue is similar to that of millet. A weed, Striga spp. (S. hermontheca and S. asiatica) appears in September and is a serious pest. Farmers are advised to uproot and burn them, but this is not practiced. A small quantity of grain enters the commercial market for use in feed rations. In pounding both sorghum and millet kernels preparatory to cooking, the seed coat is removed as bran called "coos". This is used as livestock feed on the compound.

E. Rice

Rice is essentially grown for home consumption or local sale. The commercial demand has caused a continuous increase in its importation. It is grown on alluvial soils (irrigated and non-irrigated) and in upland (rainfed) areas. In recent years, the upland rice planted in depressions of plateaus and colluvial areas has declined because of low yields. Irrigated rice has largely been developed since 1966 from activities of the Taiwan rice mission and since 1973 the Agricultural Development Project. In recent years, the People's Republic of China has collaborated with The Gambia in studies with irrigated rice. A project to utilize lowland areas in the Jakhally and Patcharr swamps is being investigated, but would supplant an area used for floodplain dry season grazing.[1]

Traditionally rice is grown by woman in the wet season using hand cultivation. Seeds are sown directly or in a nursery and seedlings transplanted into the field. In recent years, men have participated in rice growing but mainly in the Tractor Ploughing Schema developed by the Taiwan and Chinese rice missions.

Local types are mainly used in traditional rice growing but studies have indicated that introduced cultivars perform well under different ecological conditions. They are recommended and used in the government sponsored schemes. Responses to fertilizer applications have been demonstrated by experimental studies and recommendations for nitrogen and phosphorus are made by the Department of Agriculture, but limited fertilizers are used by individual rice growers.

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[1] Feasibility Study of Jakhally and Patcharr Swamps, Phases 1 and 2: Interim Report, Vols. I and II. The Gambia, Min. Agr. and Natl. Res., prepared by Louis Berger Int'l., Inc.

Harvesting under the traditional system is by single panicles as they mature, since local types are highly divergent. With improved cultivars and methods of production more uniform ripening is achieved, thus enabling harvesting by sickle. Threshing is by flailing except in the irrigated schemes where a pedal thresher has been introduced. Rice bran is a potential livestock feed and is probably used locally in the village. A small quantity is used in commercial feed rations. Rice straw is often burned but represents a source of animal feed.

F. Maize

Maize is grown throughout The Gambia as a compound crop, being planted with the onset of rains and often mixed with cassava. As soon as the grains are filled the ear is picked and roasted. Thus, maize is the first cereal to be harvested and meets a need when food supplies are likely to be in short supply. In the east (particularly in Wuli) it is sometimes planted as a field crop and harvested as mature grain for human consumption. Maize has tremendous potential as a grain supplement for use in feed grains and the stalks (stover) can be used as a feed residue for livestock.

In 1973, a scheme was initiated to produce maize for poultry feed but was unsuccessful due to lack of technical organization and marketing agreements. Technicians of the Department of Agriculture supervised the production of about 40 ha of maize in the 1977 Maize Package Program. Some 8 ha was located at the Yundum Experimental Farm, being of the cultivars Nigerian Composites (NC) 3 and 4 (improved types). This planting was well managed and used for seed multiplication. The other maize plantings were located with farmers and not well supervised. Much of the maize was eaten as roasting ears.

In 1978, the Department of Agriculture plans to continue seed multiplication of the Nigerian Composites in planning for the Maize Package Program to be launched in 1979. This scheme is part of a cereals improvement plan, including millets and sorghum, to increase food production. It is proposed that 80 ha per year of maize be located in each of 35 districts over a 5-year period. The demonstrations are to be placed on family farms. Farmers will be provided seeds and fertilizer, animal-drawn implements (to be purchased through credit from the Cooperatives) and supervision in terms of improved practices. It is this program in which the AID program would participate.

Traditional maize types have been used to the present, the most popular being Jeka. The Gambia has participated in the West Africa Uniform Maize Trials since 1968, but cultivars have not been identified that are suitable and acceptable to the traditional farmer. Several hybrid cultivars have shown promise but there is no scheme for production of hybrid seed within the country.

G. Findo (Hungry Rice)

This crop is used to augment depleted food supplies. It is seeded before or after the rains begin, being placed on marginal lands that had

little or no preliminary preparation. The fields are usually located at some distance from the compound with little attention given to weeding or other care until harvesting in September. The panicles are collected, allowed to dry and seeds threshed by flailing. Little information is available on the total area harvested and on the yields. It is estimated, however, that some 3,000 ha are sown annually and yields approach 500 kg/ha. Local types are recognized but have not been described.

H. Cassava (*Manihot esculenta*)

This starchy food crop has been grown in The Gambia for more than 200 years. Today, it is mainly grown as a compound crop for domestic consumption but people prefer rice if it is available and affordable. Stems of cassava are transplanted on ridges as soon as possible after the first rains in June and generally intersown with maize. Roots are lifted as needed from June to December of the following year. Thus, land devoted to cassava cannot be used for production of other crops during the second crop season.

At one time, commercial production was attempted in the western division when a processing plant was constructed near Banjul. The company was liquidated after several years, however, causing a decline in land area of the crop. Recently, renewed interest in cassava as a cash crop developed in the Kombos region for export of roots to Senegal. Nonetheless, total land area devoted to the crop is estimated at less than 800 hectares.

A number of local types are recognized, but three predominate. The "White" is a sweet (low in HCN content), short season type that matures in 10 to 12 months. The other two, "Gari" (or "Sierra Leone") and "Chouda", are bitter with reddish colored roots, and are long season types that mature in 12 to 18 months. Since 1972, mosaic (a virus disease) has become widespread and many plants in a field show some degree of infection. Controversy in The Gambia exists regarding effect of the disease on yields of roots.

The cassava root offers potential as a livestock feedstuff but has not been used as such in The Gambia.

I. Horticulture

Dry season vegetable growing has been carried on by farmers (usually women) for home consumption and local sale/barter for years. In 1971/72 the Ministry of Agriculture and Natural Resources in cooperation with the FAO Freedom from Hunger Campaign launched an onion-growing scheme. In conjunction with the Sahel Recovery and Rehabilitation program in 1975, AID provided about $100,000 of additional support, chiefly on the marketing side. From two pilot projects, one each in the Western and North Bank Divisions, the schemes grew rapidly so that in 1975/76 about 80 were operational with more than 3,600 members.

In the beginning, the program suffered from lack of planning and lack of foresight of marketing problems. The initial established GOTG producer price was unrealistically high and farmers overproduced without a developed marketing system. Local markets were not sufficient to absorb the supply, export markets not developed, storage facilities practically non-existent, quality grading inadequate, bags scarce and transport lacking. So the scheme had a history of financial losses and a high spoilage rate.

Division stores were built with AID assistance near the growing areas to serve as first-stage holding and drying facilities. In July, 1976, there were 21 stores, 7 of them in Western Division. A central cold-storage facility was constructed near Yundum.

The final phase (III) of the marketing scheme is scheduled for 1978 and involves increased commercialization of the trade and removal of the present fixed-pricing scheme. Probably one of the most valuable aspects of the onion-growing scheme is the experience gained by the Ministries and the growers.

Other horticultural crops, traditionally women's specialty, could easily be grown on a commercial scale in The Gambia, and better marketing policies would add to their income. A Senegalese firm was reputed to be investigating the feasibility of growing additional fruits or vegetables in The Gambia. The tourist industry around Banjul provides a ready market and foreign exchange could be conserved by local production. The airport is located in the western Division so that shipping facilities suitable for horticulture are available.

4. Rotations

The need for rotation of crops, including a fallow period, on the plateau and colluvial soils has been practiced in The Gambia for many years. There is no rotation of crops on the alluvial areas used only for rice.

The Department of Agriculture recommends a 4-year rotation: groundnuts or cotton/cereal (sorghum, millet or maize)/groundnuts/fallow. The length of the fallow required to restore soil fertility has not been established for The Gambia. Studies in other countries have shown that a period of about 20 years is required to maintain a high level of soil fertility and crop production. If commercial fertilizers or organic manures are used, the fallow period can be reduced considerably or eliminated.

A study of rotational schemes being utilized showed that only 3.6 percent of farmers followed the recommendation of the Department of Agriculture. In a field survey of two years and using cropping histories, various cropping patterns were examined (Table E). About 60 percent of the possible combinations followed a distinctive pattern. Groundnuts/fallow/groundnuts/fallow was most prevalent, being practiced by 28.7 percent of the sample. Although the recommended rotation was not usually followed, compound heads placed considerable importance on some type of rotation. There is evidence that the fallow periods are not as long now as 20 to 30 years ago. In the more heavily wooded regions, a fallow period of 4 to 5 years is common but in thickly populated regions the rest period may not exceed two years. Here the predominant vegetation tends to be grass and low-grazing woody and herbaceous species. All fallow areas are grazed during the dry season and often burned. These practices tend to reduce the effectiveness of the rest period in restoring soil fertility but the land area provides grazing during the dry season.

Rotations Established by 5-year Cropping Patterns

Cropping Pattern*	No. of Observations	% of Observations
Not Recommended		
G-F-G-F-G	466	28.7
G-C-G-C-G	140	8.6
G-F-F-F-F	123	7.6
G-D-G-D-G	106	6.5
G-F-G-F-F	33	2.0
G-F-G-C-C	29	1.8
D-G-C-G-C	26	1.6
G-C-G-F-C	22	1.4
G-F-F-G-F	18	1.1
G-D-G-C-G	17	1.0
Recommended		
G-C-G-F-G	22	1.4
C-G-F-G-C	3	0.2
G-F-G-C-G	29	1.8
F-G-C-G-F	3	0.2

*Crop Codes: G = groundnuts; C = millet/sorghum; D = findo; F = Fallow

Source: Dunsmore, J. R. et al. op cit., p. 177, 294.

5. Seed Multiplication

The need for quality seeds for planting purposes has been recognized in The Gambia for many years, but a viable program was not inaugurated until 1972 when the position of a seed-multiplication officer was established in the Department of Agriculture. He is charged with the responsibility for a seed program for oilseed groundnuts and cotton, control of stock seed of rice and the coordination of the village seed stores. The seed stores were begun in 1950 with a goal of encouraging farmers to select their seed nuts, treat them with an insecticide and then place the seeds inside a locked storeroom during the dry season. This practice protects the planting seed from pests, fire, theft and consumption or sale by the owner. By 1975 there were 409 such stores capable of holding 70 to 75 percent of the national needs for planting.

The Department of Agriculture has set a target to produce sufficient seeds of oil-type groundnuts to supply 20 percent of the country's annual needs for planting stocks. With current practices this would occupy about two percent of the total land area of groundnuts. Despite this intent, most farmers save their own seeds and practice some degree of hand selection by discarding shriveled and broken kernels.

The presently used cotton cultivar, BJA592, was adopted as the most appropriate type in 1973. The program of cotton seed multiplication involved importation of a nucleus stock and subsequent increase for distribution to growers.

To the present, no seeds of upland cereals have been produced for distribution to farmers.

There are no facilities for drying, cleaning, grading or treating seeds, no seed-testing laboratory, no emergency seed-reserve stock or seed registration.

6. Government Programs and Policies

A. Marketing

1. The Gambian Produce Marketing Board (GPMB)

This organization exercises monopoly control over purchase, processing, and sale of groundnuts. Large commercial organizations serve as authorized agents which appoint licensed traders for the purchase of groundnuts. There are currently about 72 buying stations covering linear regions of about 10 to 15 miles each.

Authorized agents and licensed traders receive a buying allowance of D21 per ton which includes interest, transport, labor and screening. Net profits amount to an estimated D5 per ton. Expatriate-owned firms were formerly important but now play a minimal role. Commercial traders are also being gradually eliminated and eventually cooperatives will be the sole agents for groundnuts.

Overseas sales of groundnuts are handled by a London subsidiary of the GPMB. Recently the UK has been the major buyer for oil cake. France may play a more important role if the new, more stringent aflatoxin regulations pose a problem to UK feed mixers.

Pricing policies are heavily influenced by the GPMB's assessment of world market prices and the prevailing price in Senegal. In the past the Gambian price has been slightly higher than the Senegalese price, and groundnuts have moved into The Gambia. Recently prices have been comparable.

The GPMB is also sole purchasing organization for cotton and palm kernels. Similar purchasing methods and official price policies are applied to both crops. Palm kernel production was about 1,400 tons in 1975/76, being less than the previous year. Cotton production has been growing very slowly. Even with a producer price increase of 12.5 percent, production only rose from 266 tons in 1974/75 to 292 tons in 1975/76.

The Board is the sole importer of rice. It is estimated that 30,000 tons or more are imported annually but reportedly about one-half is re-exported to Senegal because of the more favorable price. The pricing policy has changed so that less outflow will probably occur.

The GPMB is also responsible for the importation of fertilizer. Although the amount imported is small, only 4,600 tons in 1975, the subsidy is high, amounting to about 50 percent of the price. If the Five-year Plan recommendations for 280,000 acres under cultivation were followed, with fertilizer used at the rate of 1 bag per acre, then fertilizer requirements would amount to 14,000 tons, enough to consider the feasibility of having a small bulk mixing and bagging plant in the country.

ii. The Cooperative Movement

The Department of Cooperatives is in the Ministry of Agriculture and Natural Resources. It supports 62 primary societies, joined in The Gambia Cooperative Union (GCU) that provides centralized accounting, purchasing and administrative services to its members. In the past the main activities have been groundnut purchasing and extension of short-term credit on subsistence loans to the members.

The distribution of the cooperatives extends throughout the country, although there are some areas where farmers live more than 15 miles from the nearest center. The Ministry of Agriculture plans to make the cooperatives into multipurpose units. Credit is granted so as to expand from subsistence on short-term loans into medium and long-term loans for agricultural inputs. Sales of agricultural inputs and marketing of surplus cereal crops will also be undertaken.

D. Agricultural Extension Program

Each Department within the Ministry of Agriculture has its own extension activities: the Agricultural Department, the Animal Health and Production Department, the Fisheries Department and the Cooperative Department. The existing staff numbers slightly over 500 persons. About 225 are demonstrators concerned with single crops: 100 with rice, 50 each with cotton and groundnuts and the remainder with horticultural extension.

There are about 120 instructors and about 100 agricultural assistants. At the most senior levels there are eight agricultural superintendents and seven senior assistants. Each Division has either an agricultural officer (degree level) or a senior agricultural superintendent (diploma level) in charge. Staffing patterns for the extension service appear to be adequate. With over 100 junior extension staff in the field, each field person has an average of 160 compounds to reach.

Mixed Farming Centers (MFC's) are distributed throughout the Divisions. They once served as residential centers for young farmers learning how to train oxen. A recent change in the Ministry policy has now established them as the central geographical locus for the extension staff who will be expected to operate at the village level. There are 24 MFC's, about five of which will be rehabilitated and expanded under the IBRD Consortium Project. They each have about 10 acres of land, some housing and in some a cattle barn, implement shed, and open meeting hall.

The major problems with the extension staff are lack of supporting services, especially transport, training and organization. Without transport, or sufficient payment to reimburse their own transport adequately, effectiveness is severely hampered.

C. Agricultural Research

Most agricultural research has been carried out at the Yundum Research Station near Banjul. A smaller research station at Sapu in McCarthy Island Division concentrates on irrigated rice research, mainly on variety screening and water control, with some upland cereal research. The Yundum Station has sections dealing with agronomy, crop protection, horticulture, chemistry, agricultural engineering, forestry, and animal husbandry and does work in varietal screening, basic nutrition, and crop protection trials.

7. Forage Crops

There are no land areas in The Gambia devoted to improved forage species. Limited adaptation trials with introduced grasses and the legumes have been carried out by staff of the Department of Animal Health and Production at the Yundum, Sapu Experimental Stations and on the MFC's. No information is available regarding potential herbage yields, persistence in terms of competition with existing vegetation, mode of incorporating suitable types into the fallow or grazing systems, seed yields, etc. The trials have been handled by technicians with training in animal husbandry and with no experience in agronomic practices.

Several Stylosanthes species have been observed in non-replicated trials and seeds have been harvested for additional seed multiplication plots. S. humilis (Townsville stylo) appears the most promising. One Cenchrus ciliaris introduction was observed and seeds harvested for multiplication. Introductions of other species have also been observed but appear less promising.

The evaluation of improved forage species and their utilization in integrated livestock-crop production systems is an area in which AID would become involved. Before improved forage can become a viable component of the farming system, however, it will be necessary to impose some form of controlled grazing.

Livestock owners and herdsmen depend on native and naturalized vegetation and crop residues for feedstuffs. Natural grazing (herbage of grasses and forbs) is abundant during July to October and quality is adequate to meet the needs of mature stock. Young stock would respond substantially to supplementary feed if made available. By the beginning of November nutritive value of the grazingland vegetation has declined to the extent of being unsatisfactory to maintain animal weights. During the dry season the livestock depend on crop residues, floodplain and swampland grazing and browse of fallow areas. In some instances trees are lopped as feedstuff.

Throughout the central and eastern areas of the country, the herbaceous vegetation on the upland has been reduced to a small number of species. In the higher rainfall regions of the western area more dense vegetation and taller grasses provail.

Herdmen complain that upland farming is encroaching on their grazing areas and that expansion of crop land frequently prevents access to grazinglands. Concern has been expressed about the reclaiming of lowland areas for rice growing, thus reducing the floodplain grazing. Conflict between cattle owners/herdsmen and croppers has been an issue for a number of years. A recent proposal would establish recognized stock routes to common grazing areas.

ANNEX H - SECTION B

LIVESTOCK PRODUCTION

B. LIVESTOCK SITUATION

1. GENERAL

Over 80% of the Gambian population is directly engaged in agricultural activities. About 15 percent actually herd cattle and almost all farm compounds maintain small numbers of sheep, goats and/or poultry[1/]. Livestock of all classes are kept under traditional husbandry systems which stress maintenance of a large inventory of animals of relatively low individual productivity. Currently, livestock are estimated to contribute 2 to 4 percent to the annual national gross domestic product (GNP). Foreign exchange earnings from livestock are of minor importance, although there is some flow of slaughter cattle on the hoof into Senegal. The low contribution by livestock to the GNP represents only the value of meat processed through official channels. It essentially excludes the products from small ruminants and poultry, milk and meat consumed in rural areas, animal traction, the value of manures for fertilizer, and increased capital through growth of the national livestock population. In addition, livestock serve Gambian rural households in a number of other ways, such as a preferred method of rural savings in areas where there are a few other viable investment alternatives and ownership, particularly of cattle, brings with it social status and capacity for reciprocity in social interactions. Livestock also serve farmers as a hedge against the risks inherent in any traditional agricultural situation where crop production is almost wholly tied to the quantity and distribution of annual precipitation. With the recent governmental efforts at intensified development of the rural areas, draft oxen for animal traction are assuming a major role in the input packages for improved crop cultivation systems.

2. LIVESTOCK NUMBERS AND DISTRIBUTION

a) CATTLE

The national herd is composed mainly of the N'Dama breed (*Bos taurus*) and some Gobra Zebu (*Bos indicus*), a breed from nearby areas in Senegal (Table 1). The predominance of the N'Dama is probably due to their superior tolerance to trypanosomiasis and The Gambia's proximity to the Fouta Djallon plateau in Guinea where the breed originated.

The N'Dama is medium in size as compared to most other breeds in West Africa. They are sturdy with a thickset conformation over a compact skeletal frame. Not only do they survive under conditions sometimes too severe for other breeds, they also have reasonably good capacity to respond to improved feeding, particularly for beef production. Conversely, the N'Dama has neither the foraging ability nor the trekking endurance of the Zebu breeds on open rangelands.

The local N'Dama show reasonable weight for age gains under traditional husbandry practices as illustrated from a field survey of 2,032

1/ Eriksen, J. 1977. Livestock Sector Analysis for The Gambia. Gambia River basin study, U.S. AID, REDSO/WA, Abidjan.

TABLE I : GAMBIAN NATIONAL CATTLE CENSUS : 1977-1978

Administrative Division	Ndama Females	Gobra Females	Ndama Males	Gobra Males	Plough Oxen	1977/78 Totals	1976/77 Totals	1975/76 Totals	1974/75 Totals
Upper River	51,454	40	24,723	87	6,233	82,537	81,450	-	73,093
MacCarthy Island	73,310	5	25,495	49	2,151	101,010	88,705	-	89,320
North Bank	31,733	6	11,517	20	2,456	45,732	42,572	39,974	43,151
Lower River	14,653	4	9,518	-	1,269	25,444	21,933	20,291	18,118
Western	28,569	-	11,438	52	3,314	43,373			
National Totals	199,719	55	82,691	208	15,423	298,096			

Source : Department of Animal Health and Production, Ministry of Agriculture and Natural Resources, Government of The Gambia, Banjul : July 1978.

GAMBIA NATIONAL CATTLE CENSUS : 1977-1978

Administrati[illegible] Division	Number of Villages	Number of Herds	Mean Number of Herds/Village	Mean Number of Cattle/Village	Mean Number of Cattle/Herd	Mean Number of Oxen Pairs/Village
Upper River	313	1,270	4.1	264	65	10
MacCarthy Island	375	1,278	3.4	269	79	3
North Bank	231	663	2.9	198	69	5
Lower River	109	382	3.5	233	67	6
Western	190	629	3.3	228	69	9
National Totals	1,218	4,222	3.5	245	71	6

GAMBIAN NATIONAL CATTLE CENSUS : 1977-1978

UPPER RIVER DIVISION

Administrative District	Number of Villages	Number of Herds	Ndama Females	Gobra Females	Ndama Males	Gobra Males	Work Oxen	Total Cattle
Kantora	41	163	7,172	9	3,208	31	1,333	11,753
Wuli	76	332	13,189	31	5,681	48	1,933	20,882
Sandu	50	232	7,776	-	3,216	3	859	11,854
Fulladu East	146	543	23,317	-	12,618	5	2,108	38.048
Division Totals	313	1,270	51,454	40	24,723	87	6,233	82,537

GAMBIAN NATIONAL CATTLE CENSUS : 1977-1978

UPPER RIVER DIVISION

Administrative District	Mean Density of Cattle/Kilometer	Mean Number of Herds/Village	Mean Number of Cattle/Village	Mean Number of Cattle/Herd	Mean Number of Oxen Pairs/Village
Kantora	35.3	4.0	287	72	16.3
Wuli	36.3	4.4	275	63	12.7
Sandu	36.4	4.6	237	51	8.6
Fulladu East	49.2	3.7	261	70	7.2
Division Totals	41.1	4.1	264	65	10.0

GAMBIAN NATIONAL CATTLE CENSUS : 1977-1978

MACCARTHY ISLAND DIVISION

Administrative District	Number of Villages	Number of Herds	Ndama Females	Gobra Females	Ndama Males	Gobra Males	Work Oxen	Total Cattle
Fulladu West	108	360	28,887	-	10,188	-	1,107	40,282
Niamina East	29	98	4,904	-	1,559	-	162	6,625
Niamina West	28	105	3,922	-	1,219	1	127	5,269
Niamina Dankunku	17	55	2,379	-	761	-	99	3,239
Sami	48	210	8,732	4	3,563	37	40	12,376
MacCarthy Island	1	6	366	-	106	-	-	472
Nisni	16	52	8,826	1	3,119	11	30	11,987
Nianija	25	94	4,081	-	1,414	-	31	5,526
Upper Saloum	61	167	6,626	-	2,156	-	324	9,106
Lower Saloum	42	131	4,587	-	1,410	-	231	6,228
Division Tot	375	,278	73,310	5	25,495	49	,151	01,010

GAMBIAN NATIONAL CATTLE CENSUS - [illegible]

MacCARTHY ISLAND DIVISION

Administrative District	Mean Density of Cattle/Kilometer	Mean Number of Herds/Village	Mean Number of Cattle/Village	Mean Number of Cattle/Herd	Mean Number of Oxen Pairs/Villa
Fulladu West	51.9	3.3	372	112	5.1
Niamina East	18.4	3.4	228	68	2.8
Niamina West	41.8	3.8	188	50	2.3
Niamina Dankunku	29.7	3.2	191	59	2.9
Sami	24.7	4.4	258	59	0.4
MacCarthy Island	41.0	6.0	472	79	0.0
Niani	29.2	3.3	749	230	0.3
Nianija	42.0	3.8	221	59	0.6
Upper Saloum	34.2	2.7	149	55	2.7
Lower Saloum	39.7	3.1	148	48	2.8
Division Total:	35.5	3.4	269	79	2.9

GAMBIAN NATIONAL CATTLE CENSUS : 1977-1978

NORTH BANK DIVISION

Administrative District	Number of Villages	Number of Herds	Ndama Females	Gobra Females	Ndama Males	Gobra Males	Work Oxen	Total Cattle
Upper Baddibu	71	250	9,517	3	3,358	11	892	13,781
Central Baddibu	21	16	2,912	1	1,141	3	191	4,248
Lower Baddibu	17	46	2,068	2	744	5	110	2,929
Jokadu	33	98	4,833	-	1,795	1	182	6,811
Upper Niumi	36	85	3,587	-	1,372	-	332	5,291
Lower Niumi	53	168	8,816	-	3,107	-	749	12,672
Division Totals	231	663	31,733	6	11,517	20	2,456	45,732

GAMBIAN NATIONAL CATTLE CENSUS : 1977-1978

NORTH BANK DIVISION

Administrative District	Mean Density of Cattle/Kilometer	Mean Number of Herds/Village	Mean Number of Cattle/Village	Mean Number of Cattle/Herd	Mean Number of Oxen Pairs/Village
Upper Baddibu	19.4	3.5	194	55	6.3
Central Baddibu	16.2	0.8	202	266	4.6
Lower Baddibu	14.9	2.7	172	64	3.2
Jokadu	30.0	3.0	206	70	2.8
Upper Niumi	13.3	2.4	147	62	4.6
Lower Niumi	35.4	3.2	239	75	7.1
Division Totals	21.3	2.9	198	69	5.3

GAMBIAN NATIONAL CATTLE CENSUS : 1977-1978

LOWER RIVER DIVISION

Administrative District	Number of Villages	Number of Herds	Ndama Females	Gobra Females	Ndama Males	Gobra Males	Work Oxen	Total Cattle
Jarra East	26	84	3,972	-	5,196	-	141	9,309
Jarra Central	12	44	2,106	-	683	-	132	2,921
Jarra West	18	76	3,284	-	1,102	-	214	4,600
Kiang East	13	46	926	-	653	-	188	1,767
Kiang Central	15	56	2,302	-	928	-	197	3,427
Kiang West	25	76	2,063	4	956	-	397	3,420
Division Totals	109	382	4,653	4	9,518	-	,269	25,444

GAMBIA NATIONAL CATTLE CENSUS : 1977-1978

LOWER RIVER DIVISION

Administrative District	Mean Density of Cattle/Kilometer	Mean Number of Herds/Village	Mean Number of Cattle/Village	Mean Number of Cattle/Herd	Mean Number of Oxen Pairs/Village
Jarra East	38.9	3.2	358	111	2.7
Jarra Central	17.0	3.7	243	66	5.5
Jarra West	27.2	4.2	255	105	5.9
Kiang East	16.8	3.5	136	38	7.2
Kiang Central	20.9	3.7	228	61	6.6
Kiang West	4.9	3.0	137	45	7.9
Division Totals	16.4	3.5	233	67	5.8

GAMBIAN NATIONAL CATTLE CENSUS : 1977-1978

WESTERN DIVISION

Administrative District	Number of Villages	Number of Herds	Ndama Females	Gobra Females	Ndama Males	Gobra Males	Work Oxen	Total Cattle
Foni Jarrol	14	42	1,624	-	606	-	247	2,477
Foni Bondali	17	51	1,616	-	654	-	247	2,517
Foni Bintang	34	86	3,240	-	1,404	-	748	5,392
Foni Kansala	30	65	2,043	-	721	-	499	3,263
Foni Brefet	14	55	2,448	-	1,037	-	345	3,830
Kombo East	27	72	3,438	-	1,648	52	332	5,470
Kombo Central	10	52	3,388	-	1,441	-	375	5,204
Kombo South	16	102	5,584	-	2,038	-	355	7,977
Kombo North	20	80	4,063	-	1,447	-	164	5,674
Kombo St. Mary	8	24	1,125	-	442	-	2	1,569
Division Totals	190	629	28,569	-	11,438	52	3,314	43,373

GAMBIAN NATIONAL CATTLE CENSUS : 1977-1978

WESTERN DIVISION

Administrative District	Mean Density of Cattle/Kilometer	Mean Number of Herds/Village	Mean Number of Cattle/Village	Mean Number of Cattle/Herd	Mean Number of Oxen Pairs/Village
Foni Jarrol	27.2	3.0	177	59	8.8
Foni Bondali	15.1	3.0	148	49	7.3
Foni Bintang	18.6	2.5	159	63	11.0
Foni Kansala	24.7	2.2	109	50	8.3
Foni Brefet	29.7	3.9	274	70	12.3
Kombo East	20.2	2.7	203	76	6.2
Kombo Central	26.8	5.2	193	100	18.8
Kombo South	25.8	6.4	499	78	11.1
Kombo North	32.3	4.0	284	71	4.1
Kombo St. Mary	20.8	3.0	196	65	0.1
Division Total	23.6	3.3	228	69	8.7

animals, 1975-77 (Table 2).

TABLE 2. AVERAGE BODY WEIGHTS (KG) FOR N'DAMA BY AGE GROUPS UNDER TRADITIONAL HUSBANDRY N THE SAPU AREA OF THE GAMBIA

Sex	Age in Years					
	0-1	1-2	2-3	3-4	4-5	>5
Females	40.4	98.1	141.1	187.0	200.9	221.0
Males	46.3	100.7	153.0	188.0	244.2	310.0
Castrates	—	154.3	182.0	191.1	283.3	310.0

Source: Ibid[1/]

Under improved feeding and management, targeted specifically for beef production, there seem to be no technical reasons why N'Dama steers could not be weighing 300 or more kg by forty months of age or less instead of 60 or more months under traditional husbandry (Table 2).

Average milk yield per lactation for N'Dama cows under traditional conditions is low. Reports from experimental stations throughout West Africa cite yields between 400 and 1,200 liters in lactations of 6 to 7 months. Low milk yields also bring into serious question any scheme to use N'Dama cows as the basis for urban dairy operations. Crossing N'Dama cattle with one or more breeds with higher milk yield potential might be recommended but it would take a large urban market for dairy operations to become financially viable. Such a market does not exist at present in the country.

The Gambian cattle herd suffered no sudden and dramatic losses during the Sahelian drought years. However, there are reports from the post-drought period which indicate there was a serious impact on certain sex/age classes - calves and females of lactating age. Drought effects have not been fully evaluated. Unlike most of the other countries in the region, the Gambian cattle herd showed continuous growth in numbers for the period 1961-1978. The herd grew at an annaul rate of about 3 percent from 1961 to 1976. Whether this growth rate has been uniform or subject to sharp annual variations is unknown. A recent report[2/] indicates that due to reduced mortality during the JP 15 (rinderpest) campaign of the late 1960's and the traditional habit of keeping as many animals as possible, the number of cattle rose from 180,000 head in 1964 to 270,000 head in 1970. This suggests an annual growth rate as high as 7 percent, which is a

[2/] Deutschegesellchaft Fur Technische Zusammenarbeit and Societe d'Estudes pour le Developpement Economique et Social, Animal Health in The Gambia: Analysis of Existing Animal Health Services and Proposals Concerning Their Improvement. May 1976, p. 6.

dubious estimate for a national herd under traditional management.

The geographic distribution of the national cattle herd is disproportional. The eastern divisions of the country carry many more cattle per square kilometer and per inhabitant than do those farther down the Gambia River (Table 1). McCarthy Island and Upper River Divisions both carried in excess of 35 cattle per square kilometer and had about 0.8 cattle per inhabitant in 1978. This is approximately 62 percent of the national herd concentrated on 46 percent of the country's land surface but divided among only 38 percent of the country's population.

With regard to age and sex distribution in the herds, there have been numerous estimates. Some are based on actual field surveys, while others are simply projections from assumed parameters. Field sampling in recent years indicate quite marked differences in herd structure in different areas of the country (Tables 3 and 4). The principal differences are higher retention of overage females in some herds; higher percentage of castrates in others; and some evidence of differential sex mortality, particularly in calves and yearlings. Conversely, there is no evidence of excessive retention of intact males in the herds beyond about five years of age.

b) SHEEP AND GOATS

Estimates of the small ruminant population of The Gambia ranges between 180,000 and 300,000 head. According to FAO statistics, sheep and goats are present in approximately equal numbers (96,000 sheep and 94,000 goats) but government estimates show sheep and goats in a ratio of about 3 to 5 with, approximately 113,000 sheep and 187,000 goats. In any case, it appears that sheep and goats are equivalent to about 70,000 cattle units which means they need 15 to 20 percent of the total feed supplies required for cattle.

Although there is little economic and technical data on small ruminants, their role in the rural economy is important. These species provide meat, milk and skins for village consumption. Since they have a shorter generation turnover and relatively low individual economic cost compared to cattle, sheep and goats are much more likely to enter village-level livestock trade and consumption than are cattle. In keeping with rural tradition in the Gambia, women are more apt to be charged with the care of small ruminants. Women are usually the primary beneficiaries of sales of these animals. Mutton often sells at a price per kilogram about double that of beef and goat meat, thus proceeds from sales of sheep alone are considerable.

c) SWINE AND POULTRY

Swine production is strictly oriented towards the very limited non-Muslim market, principally around Banjul. Due to cultural inhibitors and limited feeds suitable for pork production, swine remain a speciality enterprise for a small number of peri-urban farmers.

Poultry rearing is widespread. Production around Banjul and other larger towns is oriented toward commercial fresh egg and meat trades;

TABLE 3: AGE AND SEX DISTRIBUTION OF CATTLE IN SAPU AREA. THE GAMBIA

Age in Years	Females		Males		Castrates	
	Number	%	Number	%	Number	%
0 - 1	177	8.7	159	7.8	0	0
1 - 2	203	10.0	172	8.5	1	0
2 - 3	91	4.5	87	4.3	5	0
3 - 4	98	4.8	60	3.0	25	1.3
4 - 5	246	12.1	54	2.7	50	2.5
5 - 10	353	17.4	17	0.8	44	2.2
10 plus	185	9.1	1	0	4	0
TOTAL	1,353	66.6	550	27.1	129	6.3

SOURCE: Derek Clifford, Private Communication

NOTES:
1. Actual sample size was 2,032 animals.
2. Total breeding females was 784.
3. Survey was conducted in January 1975.

1/ Castrate % rounded.

TABLE 4: AGE AND SEX DISTRIBUTION OF CATTLE IN KENEBA AREA, THE GAMBIA

Age in Years	Females		Males		Castrate	
	Number	%	Number	%	Number	%
0 - 1	7	2.5	14	5.1	0	0
1 - 2	20	7.2	23	8.3	0	0
2 - 3	14	5.1	13	4.7	0	0
3 - 4	10	3.6	12	4.4	2	0.7
4 - 5	20	7.2	11	4.0	9	3.3
5 - 10	51	18.5	8	2.9	36	13.0
10 plus	24	8.7	0	0	2	0.7
TOTAL	46	52.9	81	29.4	49	17.7

SOURCE: Derek Clifford, Private Communication

NOTES: 1. Actual sample size was 276 animals.

2. Total breeding females was unreported.

3. Survey was conducted in December 1974.

whereas, in rural areas concentration is more on meat production for village consumption. Improved breeds predominate for the former and native breeds for the latter. The Animal Health and Production Division (AHPD) of the Department of Aniaml Health and Production has an ongoing program to service the needs of poultry producers by providing chicks of an improved breed and guidance for poultry management techniques through a village flock upgrading activity.

d) OTHER ANIMALS

In both relative and absolute terms, horses and donkeys make significant contributions. Both species are used for riding, cartage and field work. There are no census data on numbers but estimates indicate the donkey population has grown since the drought, especially for traction in groundnut planting and pulling of two-wheel carts. Numbers of these species may increase rather rapidly with expanded use of farm carts in rural areas.

3. LIVESTOCK PRODUCTION AND MANAGEMENT SYSTEMS

a) OWNERSHIP

For cattle, there are at least three basic systems of herd management (ox farmer, owner-operator and contract herder). In one, the ownership and herd management functions are combined in the same person or group of persons (ox farmer). In the second, the ownership of the cattle may be in the hands of a single person or group of people who have direct daily managerial supervision over them (owner-operator). In the third case, actual management of the herds is the responsibility of one or more herders, usually hired Fula (Fulani) men, who are paid by the owners (contract herder).

Management of herds is correlated with ethnic group and to large extent with herd size. The Fula, who are concentrated geographically in the eastern half of the country, are primarily herders by preference and training. They tend to have managerial control over the majority of the cattle in the country either through direct management of their own cattle (owner-operator) or hired herding (contract herders) for other ethnic groups - the Mandinka, the Wolof and the Serahuli. These three groups are primarily sedentary agriculturalists concerned with cash and food crop production or, as in the case of the Serahuli, heavily engaged in commercial activities. While each ethnic group owns cattle for a variety of reasons, they are not generally noted for their stock-handling activities and thus generally depend on contract herders for stock maintenance.

Slightly more than half of the herds number from 45 to 266 animals (average 71 head) are owned by a principal owner and several other unrelated individuals. The former usually owns more than half of the animals. A quarter of the herds are owned either by a single person or jointly by a single family unit, usually Fula. Slightly less than a quarter of all herds are owned by several unrelated owners with each having approximately the same number of animals. Owners of fewer than 30 animals are induced to join with others in forming composite herds since they find it unfeasible to support a hired herder from the produce

of their animals. In the absence of such arrangements, small herds are likely to be owner-managed. A sampling of herd size and ownership is given in Table 5. Multiple ownership has the advantage of low cost to individual owners but often complicates actions on most efficient herd management due to variations in primary objectives of the individuals involved.

b) MANAGEMENT

The interest taken by cattle owners varies from an almost total pre-occupation in the case of the owner-operator; to daily owner inspection when the herder brings the herd conveniently close to the village; to weekly, monthly or even yearly visits when the owner and herder are not in close proximity to each other. In some extreme cases owners may never see their animals but depend wholly on reports from the herder as to their location and state of well being. In non-owner-managed herds the hired herder has the primary responsibility for daily management decisions regarding herd welfare with the owner intervening only on major items like cattle sales and/or decisions about purchases of production inputs and services.

When contract herders are employed, they always receive part of their remuneration in kind - namely milk - but many also receive accommodation and food. An increasing number are paid an agreed sum of between U.S. $0.60 and $0.90 per animal per year.

Divorcing of ownership and managerial responsibilities for the herds, especially where there is actual absentee ownership, is a major hindrance to execution of any cattle improvement efforts. It generates a number of complications in development of technology and interfacing technology with operations because there are two client groups with differing objectives. Interventions aimed at the modernizing of production through increased inputs or better husbandry must not only appeal to the economic and social objectives of those who own cattle but must also appeal to the contract herders' objectives in some tangible way. If the contract herders are principally interested in the accumulation of money for the purchase of their own animals and/or for bridal payment, better husbandry of the hard on a day-to-day basis will depend in no small measure on their being given a real economic stake in the increased productivity derived from the proposed interventions. Development and application of technology should be much more straightforward for ox farmers.

Overall, economic and technical efficiency of cattle operations is constrained by two classes of problems: the multiplicity of objectives of owners and herders in maintaining stock; and a range of complicated and interrelated technical factors involving animal nutrition, health, reproduction and general management. With regard to the first class of problems what is most often attacked by outside experts when they attempt to analyze traditional herding systems for the first time is the obvious disparity between existing productive efficiency of the animals maintained and the productivity that might be obtained with known animal husbandry techniques. What is often not acknowledged is that the traditional herder is frequently trying to satisfy several ojectives. In most modern livestock operations, multiple objectives have been essentially eliminated.

TABLE 5: AVERAGE NUMBER OF CATTLE PER HERD AND NUMBER OF OWNERS PER HERD FROM SAMPLES IN THE FIVE GEOGRAPHIC DIVISIONS

Geographic Division	No. of Herds	No. per Herd	No. Owners per Herd	Animals per Owner
Western	9	90	3.0	30
Lower River	10	83	3.4	24
McCarthy Island	10	75	3.5	21
Upper River	7	115	4.3	27
North Bank	10	109	9.6	30

SOURCE: Dunsmore, J.R., et al 1976. The Agricultural Development of The Gambia: An Agricultural, Environmental and Socioeconomic Analysis. Land Resource Study 22. LRD, Min. Overseas Dev., Surrey, England.

Production systems are geared quite specifically to the most direct and economically efficient method of producing a single primary product like meat or milk. But, Gambian herders are trying to obtain meat, milk, replacements, working capacity and organic fertilizer for their fields all from the same animals at virtually the same time; thus, their objectives are in conflict with each other.

c) FEED RESOURCES

Of the technical factors hindering greater output of livestock products, the core problem is one of inadequate nutrition - particularly in young stock. Grazing from natural grazing lands and land in various stages of fallow is reported as adequate in quantity and possibly in quality for most classes of ruminants from June until approximately the end of October - the period corresponding to the rainy season (Table 6).

TABLE 6. TEMPERATURE (°C) AND RAINFALL (MM) FOR YUNDUM AIRPORT (LATITUDE 13°31'N)

Month	Temperatures[a] Maximum	Minimum	Rainfall[b]
J	31.9	14.9	.8
F	32.9	16.2	.9
M	33.8	17.0	.0
A	32.8	18.2	.0
M	31.6	20.0	4.6
J	31.6	22.7	68.8
J	30.2	23.2	269.4
A	29.6	22.9	469.4
S	30.4	22.6	300.9
O	31.6	22.1	95.4
N	32.3	18.8	6.3
D	31.2	15.8	.7
Avg	31.7	19.6	1216.2

[a] Averages for 1949-73

[b] Averages for 1946-73

For a period of seven to eight months, the nutritive value of grazing lands is low in both total digestible nutrients and digestible protein. This situation is ameliorated to a limited extent by allowing cattle, sheep and goats access to field crop residues (mainly from groundnuts); stubbles of millet, sorghum and maize; and floodplain or

swamp grazing during the dry season. A number of woody species, such as the Pterocarpus erinaceus, which is lopped for feed, provide some much needed protein for animals during the dry season.

According to Dunsmore et al.[3/] there is an abundance of feed from natural grasslands during the rainly season; however, herders frequently complain that not only is dryland farming increasingly encroaching on traditional grazing areas but that cropped fields frequently are too close together for access to the grazing. Disputes over damage to growing crops are on the increase.

Feed resources in the dry season are the real crux to the cattle sector. Estimates from aerial photographs indicate 48,500 ha of swamp with reasonably good grass cover[4/]. Cropping, particularly for rice, continues to reduce this resource; oftentimes preventing access to larger areas of grass than cultivated. Carrying capacity of this type of grazing is given as 0.7 ha per adult cow. A large quantity of dried grass is gathered during the dry season for thatching. How much this affects feed supplies is undetermined.

It is difficult to determine the actual contribution of standing straws, crop residues, and browse of woody plants to dry season feed resources. In the case of crop residues, there are large variations in yields per unit of land and there are differences in the extent of utilization of the residues. In several districts much of the crop residues is left lying on the ground to be lost to weather and trampling. Table 7 gives estimates of the annual yield of crop residues for the whole country but this is much higher than actually used by animals; nevertheless, they do provide a base on possible availability. Groundnut residues are used extensively for feed. Sorghums and millets are cut, the heads removed and the stalks left lying in the field. Portions of the stalks are gathered for use as fencing around compounds. The rest is left for livestock to graze. Prior to planting the following year the remaining stalks are raked and burned. The rice fields are usually several kilometers from the village compounds; therefore, only the grain is removed. Rice straw is probably least used as it is left piled in the field. The cattle trample a large portion as they prefer the stubble and some regrowth of the rice plants.

The estimate is about 70 percent of the needs for the cattle population with no allowance for small ruminants, horses and donkeys nor for losses due to causes already mentioned.

Besides grazing and crop residues, sources of animal feed are limited.

[3/] Dunsmore, J.R. et al., 1976. The Agricultural Development of The Gambia: An Agricultural, Environmental and Socio-Economic Analysis. Land Resource Study 22, LRD, Min. Overseas Dev., Surrey, England.

[4/] Ibid[3/]

TABLE 7. ESTIMATED ANNUAL YIELDS OF CROP RESIDUES

Crop	Dry matter (kg/ha)	Area/crop (ha)	Total dry matter (kg x 1,000,000)
Groundnut	1,570	72,800	114.0
Sorghum	2,800	12,550	35.1
Millet	1,680	19.020	31.9
Swamp Rice	2,240	14,160	31.5
Total		118,530	212.5

Source: Ibid Table 5

Another source of dry season fodder includes browse and dry grass from annual grasses or areas in crop fallow. Frequently these are destroyed or reduced by burning in order to reduce the hazard to browse and crops or to obtain regrowth. Dunsmore et al[5] estimate dry season forages in cow units (250 kg cow):

Source	Cow Unit Equivalents
Crop residues	73,500
Flood plain grazing	69,000
Fallow	35,000
Total	177,500

These include by-products of household preparation of small grains (millet and sorghum brans) or commercially produced rice bran; whole cottonseed; groundnut cake from plants extracting oil; dried fish or by-products of fish processing; and abattoir waste in the Banjul area. Most of the brans of rice, sorghum and millet go to small ruminants, poultry or draft animals but the extent of utilization is not quantified. The vast majority of the animal population has no access to what might be termed "concentrate feeds".

Currently, there is a small feed plant operated by AHPD which produces a few tons per week of poultry feed distributed to producers participating in their poultry program. Sorghum, dried fish, rice bran and groundnut cake are used in preparation of the ration. An additional feed mill will be in operation with a capacity of two tons per hour but main ingredients to make up the concentrates are yet unidentified. There is about 200 MT of whole cottnseed available for feed, an undetermined quantity of rice bran and approximately 20,000 MT of groundnut cake[6]. The latter is largely exported to Europe. Its value is about one-fifth that of exported groundnut kernals

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[5] Ibid [3]

[6] Crittenden, R. 1978. A brief description of STABEX (Lome Convention) with reference to The Gambia. Position Paper No. 4, The Republic of The Gambia.

and one-fourth the value of oil. With pressure for foreign exchange earnings, high return for domestic use of groundnut cake must be identified before a large quantity will be released. A small brewery near Banjul produces 6 MT of wet brewers grain per week which is presently only partially utilized. Output is expected to rise to 20 MT per week by 1981.

The planned new feed mill is to serve as a market for maize grain and to stimulate maize production. How successful this will be remains to be determined. A number of livestock owners expressed interest in fattening with the use of supplementary feeding. Some are participating in the AHPD program. Expanded participation would have a significant effect on the use of prepared feeds.

The net result of the variable feed supply is that animals develop slowly by modern standards and probably never reach their full genetic potential in body weight or milk yield. Periods of near satisfactory growth or gains in weight occur during the rainy season but feed energy intake is no more than maintenance or less for about eight months per year. Average daily gains for cattle are about 200 g over the year. Skeletal development and virtually all measures of performance are adversely affected by low nutrition during the dry season. The impact is particularly serious for young stock. Calves receive only small quantities of their dam's milk due to the N'Dama's low milk capacity and competition with the herder.

d) ANIMAL HEALTH

On the whole, economic losses from morbidity far exceed that resulting from mortality. Morbidity encompasses reduced yields, growth rate, and depreciation of animal products through such causes as destr uction of parts of carcasses due to injury, disease and/or parasites; reduced quality of meat and hides resulting from insects or poor slaughtering procedures; lowered resistance of stock to diseases because of poor nutrition; and inefficient use of available pastures, other wasted feed and labor attributable to sub-clinical conditions of disease and parasites.

When cattle or any other livestock suffer simultaneously from poor nutrition and multiple health problems, their reproductive performance will be less than optimal. That this is so in the Gambia can be seen from information reported by Dunsmore et al.[7/] and Clifford[8/]. The former reports that countrywide calving percentage is 41 percent with a calving interval of 29 months. The actual conception rate of the cows may be somewhat higher than the calving rates, with abortions and other reproductive failures occurring during pregnancies due to various causes including trypanosomiasis that go unnoticed by herders. Clifford agrees on a high incidence of spontaneous abortion in the herds. Field tests are currently being conducted to determine the incidence of brucellosis, vibrosis, trichomoniasis and other reproductive diseases. Clifford found that only about 7 percent of the cows under observation in his field trials dropped a calf in two successive years. The normal pattern seems to be alternate-year calving at best.

7/ Ibid 3/

8/ Clifford, D., Personal Communication

A high percentage of aged cows are maintained sometimes for three or four years after their last full-term pregnancy in the hope they will produce one more calf. With the low reproductive efficiency herders must retain almost all available females.

In the past animal health problems have been left to the livestock owners but now the Animal Health Division of the Department of Animal Health and Production is undertaking an extensive animal health program to reduce morbidity, improve sanitation of rural milk supplies to reduce the danger of zoonosis (diseases transmissable to humans) and increase viability of stocks. Currently there are six veterinary centers and 40 substations or clinics manned by 132 Livestock Assistants and Livestock Inspectors working towards improvement of animal health, operating principally through the 42 Livestock Owner Associations (LOA). This program consists of four main features:

1. Annual vaccination campaigns of cattle for rinderpest and contagious bovine pleuropneumonia (CBPP). Vaccinations are executed during a four month period each year, usually starting in December or January. Two mobile teams of about 15 technicians each cover the country from east to west delivering 80,000 to 90,000 vaccinations against rinderpest to young stock and about 60,000 vaccinations against CBPP.

2. Spot vaccination of cattle for hemorrhagic septicemia, blackleg, and anthrax as dictated by local reports of disease outbreaks and subsequent veterinary field diagnoses. Some limited work is done in treatment of goats and sheep against small ruminant pest, streptothricosis in sheep and pneumonias of various types. Vaccinated poultry are distributed to farmers under the improvement program with a village follow-up service.

3. Personnel from area veterinary substations also carry out limited curative health treatments and parasite evacuations on all classes of livestock within the immediate vicinity of their offices. Principal activities include ectoparasite spray treatments for lice, ticks and mange mites with portable hand-pump sprayers; drenching or bolus presentation of broad spectrum antihelmintics and acaricides; curative treatment for minor wounds and other easily diagnosed problems; and castration services.

4. Major long-term research on trypanosomiasis in collaboration with a research team from the University of Glasgow. Since trypanosomiasis is an important disease in cattle and eradication of the vector is not considered feasible due to the lack of natural boundaries, research is centered on detection of the true incidence and effects of the disease in The Gambia and on prophylatic control measures for N'Dama cattle. Of particular interest is the research directed at determining "tolerance" levels to trypanosomiasis in N'Dama cattle and relating these levels to the nutritional state of the animals throughout the year.

The present animal health program appears to provide reasonably well for the cattle herd. Rinderpest has been well controlled since the joint campaigns of the 1960's and other diseases are controllable. Coverage in

vaccinations suffers from the continual restraints imposed by lack of an adequate drug supply system, inadequate field storage facilities for vaccines and medications, limited mobility of field staff due to a shortage of transport, and general deficiencies in managerial and organizational abilities among lower-level staff in planning field operations. On the other hand, field staff seem to be adequately grounded in the rather limited technical aspects of their jobs and there is general acceptance for animal health services on the part of farmers.

e) REPRODUCTION AND CALVING

With regard to the interrelationships of breeding and calf husbandry, there are a number of complex problems. There is apparently considerable variation in season of parturition. In some districts, the greatest number of calves are born during the early months of the dry season (November-December); whereas, in other districts calving occurs during the rainy season. Both periods have distinct disadvantages from the point of view of calf survival and growth. In November-December the dam would be at peak lactation potential during a time when the availability of nutritious feed to sustain the lactation is rapidly declining. For the rainy season, the dam would be providing fetal development during the period of the year when her own feed intake was at its lowest point, both quantitatively and qualitatively. Furthermore, the calf is dropped when disease incidence is highest and parasitic infestations are worst in cattle.

Another problem possibly affecting both calves and reproductive efficiency is the extended suckling period allowed by the herders. The objective seems to be to keep the cows in lactation as long as possible in order to sustain milk supply for the herder and his family. Calf suckling is used to stimulate milk let down; thus, few calves are weaned earlier than 12 months of age. Many are still suckling at 18 to 24 months[9/]. This practice has the effect of lowering reproductive efficiency through delay in the onset of estrus.

Bulls are run continuously with the cow herds. Most all cattle are tied up 12 to 15 hours per day, resulting in the cows not being served at the most appropriate time[10/].

Age at first calving for N'Dama in the government herd at Yundum is 35 months but under farm conditions first calving is 36-42 months with average herd life for cows of 8 to 9 years. Some cows last up to 14 years.

There are no data for season effects on parturition in ewes and does. Contrary to the usual occurrence in temperate areas, both species are said to produce young throughout the year. Even so, variation in feed supplies no doubt causes seasonal fluctuations. If hand mating is practiced, attempts are probably made to mate in order that young will be around market age at the time of the Muslim celebration of Tabaski.

9/ Rains, A.B., 1975. Report on Surveys of Cattle Owners and Herdsmen in The Gambia. Misc. Rpt 180, Min. Overseas Dev., LRD, Surrey, England.

10/ Ibid 9/

f) REARING OF YOUNG

In mixed farming situations, ewes or does are seldom milked; therefore, the young receive all the milk from the mother. Milk yields are generally less than 60 kg per lactation. This means that mortality may be high when multiple births occur. No data are currently available on mortality of young in either species or on age of puberty and longevity.

Calf mortality is estimated at about 20 percent of the annual calf crop. Principal, direct causes of mortality include scours, simple starvation, predation by hyenas and village dogs, severe debilitation from endoparasites and trypanosomiasis and pneumonia.

The calves do not graze with the main herd but are kept tethered in the mornings until the herd is out of sight, then released. They remain in the proximity of the tethering site with little or no supervision or care. Very infrequently are water, mineral salt, and/or supplementary feeds supplied to calves on a routine basis. A substantial number of calves also suffer from a local belief that mutiliation by slashing on the flanks is beneficial for unthrifty animals.

In the larger, immature animals (2-3 year olds) and adults, the husbandry situation is not significantly better for rapid growth and high productivity. The major problems in the immature stock are post-weaning nutritional setbacks, massive tsetse challenge when they join the main herd for bush grazing, and intraherd competition with mature animals for available feed and water because all animals are herded together. Much has also been made of the fact that immature and adult animals are often tethered without feed, water or other supplements for upwards of fifteen hours of each day. This practice is said to reduce productivity by denying the individual animal sufficient time for grazing during the best times of the day - early morning and late evening - and to reduce reproductive efficiency. However, others have stated that the tethering method is not uniformly practiced throughout the country or throughout the year and, therefore, that generalizations about the practice may exaggerate the actual effects on the animals.

Dunsmore et al.[11/] estimated mortality for cattle 12-24 months of age at 12 percent, 3 percent for those 24-36 months and 4 percent for adults.

g) BREEDING PROGRAMS

Little attention is paid to systematic attempts to improve the genetic potential and/or reproductive efficiency of species other than poultry. As pointed out above AHPD has a flock of an improved breed it is using to produce chicks and male cocks for distribution.

Castration of male livestock is limited as a practice and where adopted is done after the onset of sexual maturity; therefore, cows, does and ewes are frequently serviced by the nearest available male irrespective

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11/ Ibid 3/

of genetic merit. How much genetic improvement in stock could be accomplished through selective breeding, particularly within the N'Dama breed, is an academic question at this time given the non-discriminatory system of matings, poor nutritional state of the animals and the emphasis given by herders to traits other than milk yield or growth rate. On the other hand, when an effective improvement program in animal nutrition and health is mounted, more attention must be directed to selective breeding. Since the national herd is nearly complete N'Dama, eventually consideration must be given to keeping the breed and encourage selective breeding or going to crossbreeding. Herders would now be using Zebu for crossing to produce larger cattle if they thought problems with trypanosomasis would not increase.

h) ANIMAL TRACTION

The N'Dama performs adequately as a draft animal. Although it is not as versatile and useful as a Zebu ox for heavy tillage and cartage, a team of N'Dama will provide farmers with a suitable source of power for field operations and for hauling of agricultural inputs or farm produce in two-wheel carts.

Currently there are over 15,000 oxen being used for traction on farms (Table 1). The rate of use of oxen, donkeys and horses has increased rapidly during the past 10 years with credit systems for the acquisition of two-wheel carts and farm equipment in order to expand groundnut production. The use of oxen for traction will continue to increase but rate of expansion will depend to an extent upon available credit.

To assist farmers in the training of bullocks, programs were inaugurated at the 25 Mixed Farm Centers located throughout the country[12/] under the auspices of the Department of Agriculture. Participation was lower than desired; therefore, the policy was changed to having the trainers go to the villages for direct training on farms. This increased participation three-fold or up to about 1,500 per year. Currently a good team of bullocks will cost 1,000 dalasis (about U.S. $500) or more. The Training and Information Division has launched a program to provide guidelines on better feed and care for bullocks in order to make them more useful to farmers, particularly for land preparation and cultivation which last for 2 to 3 months.

The three groups of livestock owners identified in Section 3a) above look upon the use of cartage as a means of improving the efficiency of farm operations, thereby potentially contributing to total agriculture production. Among the LOA's surveyed ownership of farm carts varied from 30 percent of the members to over 90 percent. Some uses identified were transport of: plows, cultivators or planters to and from fields; fertilizer; groundnuts; rice from the swamps; compounds needs, such as firewood, thatching, fence posts and sorghum stalks used for fencing; and the transport of people. Numerous LOA members felt cart ownership also added to their social status in the community.

12/ Weil, P. 1968. The Introduction of the Ox Plow in Gambia. In: African Food Production Systems, Ed: P.F.M. McLoughlin, The John Hopkins Press, Baltimore.

4. LIVESTOCK MARKETING

The output from the major classes of livestock in The Gambia have been estimated as follows:

a) The current offtake from the national cattle herd is estimated at 20,000 to 27,000 head per annum which coincides to an extraction rate of 7 to 10 percent. This is equivalent to about 5,000 MT of liveweight. With an average dressing percentage of 47 to 50 percent, total beef is in the range of 2,350 to 2,500 MT per year. If the offtake is as high as 27,000 head, a large number must be slaughtered in the bush in order to sustain the expansion of the national herd given in Table 1. It seems more likely that the actual level of commercial sales and domestic slaughter is closer to the 20,000 estimate with some indeterminate number of additional carcasses salvaged from animals counted against mortality estimates.

b) Mutton production is estimated at about 588 MT of meat annually, based on a national flock of 112,000 animals with an extraction rate of 35%, and average carcass weight of 15 kg. Goat meat is estimated to contribute another 850 MT of meat based on a herd of 187,000 animals, an extraction rate of 35%, with an average carcass weight of 13 kg.

c) Poultry meat production, based on a 100% extraction rate per annum, and average weight of 1.0 kg per dressed bird, has been estimated at 300 MT[13/].

d) It is estimated that about 150 liters of milk per lactation are used for human consumption - out of an estimated total production of 350 liters per lactation. This estimate would yield a production total for human consumption of about 10,000 to 11,000 MT. This would correspond to an average per capita milk consumption of about 20 kg.

Estimated meat production from all sources is summarized in Table 8.

What is striking in reviewing the few existing statistics on livestock marketing in The Gambia is how little of the available meat actually enters formalized marketing channels. If the number of animals slaughtered under controlled conditions and inspected by the officials of the Animal Health Division can be taken as indicative of the volume of formal trade, then Table 9 is quite revealing.

While the data in Table 9 is by no means a definitive indicator of actual trade flows, it does give some crude measure of the extent of formal marketings to the urban and semi-urban areas. It is reflective of the easily observed fact that the marketing of cattle is the only livestock system that has been developed to any considerable degree.

13/ Western African Regional Office, IBRD. The Gambia: Rural Development Project Staff Report, Regional Projects Development; April 12, 1976, Annex 2, Page 4.

TABLE 8. ESTIMATED MEAT PRODUCTION IN THE GAMBIA IN 1977 (MT)

Type of meat	Tons of carcass	Tons of offals	Total availability
Beef	2,800	900	3,700
Mutton	650	100	750
Goat	915	135	1,050
Poultry	300	30	330
Other[1/]	45	15	60
Total	4,710	1,180	5,890

[1/] Other is a crude estimate of contribution in meat from swine and wild game and may include some meat from donkeys and horses.

TABLE 9. ESTIMATED FORMAL LIVESTOCK TRADE IN THE GAMB

Animals by class	Estimated total head slaughtered	3-Year average of slaughter animals inspected	% In formal trade
Cattle	20,000	11,177	56
Sheep	39,200	3,500	9
Goats	65,500	9,650	15

Although small ruminants collectively supply near 31 percent of the available meat, they are marketed mostly in an informal way at the village level. This is not to say that this trade is insignificant to either the village or the national economy but only that there are virtually no detailed studies or consistent statistics available on small ruminants. It is suspected, for example, that virtually the entire formal trade in local sheep is concentrated in the few weeks before the Muslim celebration of Tabaski each year. This might present an excellent opportunity for small farmers near major towns to engage in short, intensive fattening programs for sheep which could be sold for a premium price at Tabaski. There is no concrete way to analyze this potential enterprise however.

There are two main and competing channels in cattle sales: The Gambia Livestock Marketing Board (LMB) and the private livestock dealers. The LMB deals mainly with the purchase and shipment of cattle from the interior of the country to the capital area. Collectively private dealers have a much more articulated system of cattle trading both to urban and rural markets in the country and in an external, covert trade with Senegal.

The Cattle Marketing Act of 1955 formed the basis for initial and rather tentative government attempts at intervention in livestock marketing.

The Act was redrawn in 1972 to restructure the Gambia Cattle Marketing Board with the view to expanding and improving the marketing system and to supplying cattle to the four major capital area towns of Banjul, Bakau Serrekunda and Brikama. The Board is also formally charged with the deve opment of an export trade in cattle, but since the Gambian border with Senegal was formally closed to cattle trade in 1968-69, the shortage of meat in the Banjul market, no legal exports have taken place.

The legal intent of the Cattle Marketing Board was to strengthen, control and administer more closely the cattle trade. The 1972 Cattle Marketing Regulations state that "no person shall purchase cattle for sal except the Board, or a licensed cattle buying agent acting on behalf of the Board, or a person authorized in writing under these regulations by the Board". Control does not extend to persons buying cattle for direct personal consumption, for use as draft animals, or for breeding purposes, but it does give the Board - in theory at least - substantial control over the cattle trade in country. That control was extended to all livestock products when the new Gambia Livestock Marketing Act was passed in late 1975 and the Board was retitled the Gambia Livestock Marketing Board

LMB is managed by a Secretary with the advice of an expert provided by the Commonwealth Fund for Technical Cooperation and under the general supervision of the Director of Animal Industries Division. The staff are provided by the Division and include a sales officer and assistant sales officer at Abuko (Division headquarters), technical officers at Yoro-Bera Kunda and Basse, buying agents at Fatoto, Sare N'Gai and Farafenni, and chauffeurs. In addition, temporary buying sub-agents are employed unofficially. The Board's present equipment includes a few cattle trucks, a refrigerated van, a barge for river transport of animals, and fourteen sets of cattle weigh scales.

The impact of LMB's activities on the cattle trade in recent years has been minor. During the period July 1973 to June 1974, LMB purchased about 9,400 head of cattle at open-market prices. The operating loss for the same period was estimated at U.S. $40,000 to 45,000. Since that time, buying operations have been severely hampered by poor managerial state of the Board's operations due to the interim nature of its leadership; the limited nature of their transport network because of unavailability of reliable transport; and the rigidity of the Gambian official pricing system for meat vis-a-vis Senegal. This latter factor results in Gambian beef being sold across the border into Senegal where current prices are at least 20 percent higher than in The Gambia and/or in on-farm retention of marketable animals by producers in the expectation of even higher prices in the future. The expectation of higher prices in the near future is probably a valid one, given the emphasis in Senegal and Mauritania on rebuilding herds that were reduced during the drought years.

When one turns to the private trader group and its role in cattle marketing, one is immediately struck by the almost total lack of detailed information in the possession of the government. Apparently, there have been no studies of any kind on the composition of the private trader community, their interactions with cattle producers, their market orientation, or any of the other socio-economic factors that are relevant to the cattle trade.

Given the lack of current data, it should be obvious that any prescriptions in the marketing of livestock would be premature. What can be said in general terms is that future marketing interventions in The Gambia - be they public or private - are bound to be heavily influenced by a combination of the following factors:

1) The current low productivity of the national herd which places a definite biological constraint on the effective offtake that can be expected in any one year;

2) The multiple objectives of the owners and herders in production of livestock which dictate the extent and direction of micro-level sales;

3) Lack of a regionally articulated infrastructure for purchasing, assembling and processing of animals;

4) Limited nature of the Gambian domestic market for livestock products in terms of size, effective purchasing power and geographical orientation; and

5) The effect of exogenous factors in the export market, chiefly the tourist trade and the Senegalese market, which by their very nature are effectively beyond the control of forces within The Gambia.

It is not clear at present how these factors interact to affect the existing market. What is clear is that an effective and consistent marketing system will not develop in the future unless efforts are made now to improve the quantity and quality of data available to livestock producers and marketing agents[14/].

5. STRUCTURE OF GOVERNMENT SERVICES TO THE LIVESTOCK SECTOR

The Ministry of Agriculture and Natural Resources is the central administrative agency of the Government for agriculture and livestock efforts. It is composed of five sections:

a) The Department of Agriculture

b) The Department of Forestry

c) The Department of Cooperation

d) The Department of Animal Health and Production

e) The Department of Hydro Meteorological Services

The Department of Animal Health and Production is composed of five sub-sections:

a) The Directorate

b) The Animal Health Division

c) The Animal Husbandry and Production Division

d) The Animal Industries Division

e) The Training and Information Division

14/ Ibid 1/

Traditionally, the Department of Animal Health and Production was concerned primarily with the delivery of veterinary services to cattle and, to a lesser extent, small ruminants. During the past two years, however, there has been a marked change in the Department's perception of its own role vis-a-vis the livestock sector and in relationship to the newly formulated Five Year Development Plan. The beginning of a transition to a broader-based approach to the livestock sector is most evident in the sub-sections dealing with Animal Husbandry and Production, Animal Industries, and Training and Information. The first has seen an increase in established positions for personnel from 5 in 1975/76 to 57 in 1976/77 with an increase in budget for personnel from approximately U.S. $4,900 in 1975/76 to U.S. $59,000 in 1976/77. This is almost a 1200 percent increase in personnel and funding in one year. The Animal Industries Division has similarly benefited from an increase in personnel and budget. Personnel positions rose from 7 to 52 in 1977 and the personnel budget increased from U.S. $13,000 to U.S. $61,000. The Training and Information Division was formed for the first time with the budget presentation for 1977/1978. At the same time the Animal Health Division received about 14 percent increase in budget but incurred a net loss in establishing positions from 58 to 48 when personnel were shifted to jobs in the newly formed divisions.

In addition to the personnel in the Department of Animal Health and Production, the field operations are aided by junior grade livestock inspectors supplied and paid by local Area Councils. At present, there are about 30 men available for service at field stations and in the manning of field substations.

With regard to physical infrastructure required to carry out the various tasks of the Department, there seems to be adequate geographic coverage with field posts and experiment stations. At present, there are facilities for limited field and lab research on livestock and related matters near Banjul (Yundum, Fajara, and Abuko), and Sapu and Yoro Beri Kunda(YBK) in the east. The Department maintains an experimental herd of 200 N'Dama cattle at Yundum which could be used for feeding and husbandry trials. Fajara is the base for trypanosomiasis research being carried out by personnel associated with the University of Glasgow. The Animal Husbandry and Production Division's Poultry Multiplication unit is located at Abuko. Introduction and seed multiplication trials for grasses and legumes for forage production are underway at Yundum, Sapu and YBK.

The Department maintains six main stations and 40 satellite substations to service the livestock-owning community. These are distributed throughout the five administrative Divisions of the country and form a physical network from which field operations and extension work are carried out with herders. They are staffed by Livestock Assistants and Livestock Inspectors with supervision from Livestock Officers based at Abuko and Mansa Konko.

To facilitate field work and to give local stock-raisers more of a sense of participation in livestock service planning and decision making, Livestock Owners Associations have been orgainzed around the country. To date, forty-two such Associations have been organized at the administrative District level with a current membership of 4,494

The basic concept behind the Associations is to serve as a vehicle for communication of information and instruction about livestock matters from the government services to stock raisers; and to allow them in turn, to feed back information to the Divisions of the Department on area-specific problems and their aspirations for future development in the livestock sector. Thus, a basic structure exists in The Gambia for livestock development but services have barely begun. Substantial donor support will be required for the programs to really be effective.

Key problems of the Department of Animal Health and Production are:

a) Shortage of personnel, at middle and lower levels, with broad-based training in livestock and extension matters; and

b) Lack of material resources to support field personnel in the pursuit of assigned tasks.

Personnel problems in part should be alleviated by the return of the 22 trainees currently training outside the country in animal husbandry and veterinary medicine, along with Livestock Inspectors and Livestock Assistants in home country training.

A proposed program by the Animal Health Division to train livestock owners to treat their livestock for endo- and ecto-parasite control, if implemented, should greatly enhance the services to owners. Working through the LOA s, AHPD has a modest program underway on farm fattening of livestock. As supplementary feeds are made available, this program should undergo considerable expansion, provided supplementary feeding proves economically feasible.

6. CURRENT AND PLANNED IN-COUNTRY PROGRAMS FOR LIVESTOCK

Until the present time, the livestock sector has not been the subject of direct, comprehensive donor support. As of 1978, there were seven external donors giving or intending to give assistance to livestock development. These included the United Kingdom, the Federal Republic of Germany, and the Republic of France, the UNDP/FAO, Canada, the EEC/FED, the World Bank consortium supporting the Rural Development Project, and the United States of America.

The United Kingdom, through the vehicle of its bilateral assistance program to The Gambia, has supplied individual expatriate technicians, external training grants for Gambian officials, and general budgetary support for the Department of Animal Health and Production. These activities have been a rather small part of the United Kingdom's general assistance program and were aimed more at sustaining existing essential service capacities in animal health and livestock research. Small project interventions in hide processing services and poultry development are typical of past efforts.

France and West Germany collaborated in sending a team of animal health specialists to The Gambia in 1976 under the aegis of the CILSS/Club des Amis to perform an analytical study of the government's animal health program. This was part of a regional effort for the Sahelian states of West Africa and led to the formulation of a regional animal health assistance program in which The Gambia will participate.

A poultry project was prepared by technicians from the Federal Republic of Germany in 1975. It envisaged the development in the Banjul area of twenty medium-scale farms for egg and broiler production to meet the requirements of the high income expatriate market in the area.

The UNDP/FAO pilot livestock effort was tenatively agreed to in mid-1974 and initial implementation activities were to have started in March 1975 with the arrival of a project manager. The preliminary design of this project was based on two elements: the formulation and field testing of improvements in animal husbandry methods among cattle herders; and the mounting of pasture and fodder methods among cattle herders; and the mounting of pasture and fodder crop trials on farm fields. The project was to have consisted of a one-year preparatory phase during which the project manager was to have worked out the final details of project design, and a four-year implementation phase. Unfortunately, the original project manager's tour of duty in The Gambia was terminated for unspecified reasons There is apparently only a slim possibility that this project will be brought to an active implementation stage again in the near future.

Canada and the EEC/FED engaged in a water point development program to provide adequate livestock watering facilities throughout the country. Additionally, EEC/FED is considering an area development project in the eastern half of The Gambia. Details of this new project have not been fully worked out to date.

The Rural Development Project under the aegis of the World Bank is operating. It is an integrated rural development effort with tripartite funding by the IDA, the United Kingdom, and the Arab Development Bank (BADEA) in the amount of U.S. $11,700,000. The project has both crop and livestock components. The livestock component makes up approximately U.S. $1,525,000 of total project costs directed to animal health and cattle marketing on a national basis and animal husbandry interventions in a limited geographical area. The animal health subcomponent of the project aims at improving animal health campaigns through the provision of vaccines, drugs, equipment, transport and training for field staff. The total funding for this subcomponent is U.S. $345,000 over five years. The cattle marketing subcomponent aims at improving cattle offtake through construction of a limited number of cattle markets, stock routes and holding grounds. This subcomponent will cost U.S. $238,400.

UNDP will be providing five experts to serve as a planning group in the Ministry of Agriculture to assist mainly in marketing, credit and gathering statistics. The UNDP program also provides for financing the establishment of watering points for livestock with 28 deep bore wells.

BIBLIOGRAPHY ON LIVESTOCK SITUATION

Clifford, D. 1977. Field data for N'Dama cattle. Personal Communication

Crittenden, R. 1978. A brief description of STABEX (Lome Convention) with reference to The Gambia. Position Paper No. 4, The Republic of The Gambia.

DAHP. 1978. Department of Animal Husbandry and Production Cattle Census for 1977-78.

Deutschegesellchaft Fur Technische Zusammenarbiet and Societe d'Estudes pour le Developpement Economique et Social, Animal Health in The Gambia: Analysis of Existing Animal Health Services and Proposals concerning their improvement. May, 1976, p. 6.

Dunsmore, J.R. et al. 1976. The Agricultural Development of The Gambia: An Agricultural, Environmental and Socio-Economic Analysis. Land Resource Study 22, LRD, Min. Overseas Dev., Surrey, England.

Eriksen, J.H. 197 . Livestock Sector Analysis for The Gambia. Gambia River Basin study, U.S. AID, REDSO/WA, Abidjan.

Rains, A.B. 1975. Report on Surveys of Cattle Owners and Herdsmen in The Gambia. Misc. Rpt 180, LRD, Min Overseas Dev., Surrey, England.

Weil, P. 1968. The Introduction of the Ox Plow in Gambia. In: African Food Production Systems; Ed: P.F.M. McLouglin, The John Hopkins Press, Baltimore.

Western African Regional Office, IBRD. The Gambia: Rural Development Project Report, Regional Projects Development, April 12, 1976, Annex 2, p. 4.

ANNEX H - SECTION C

FORESTRY

Forestry

1. Consumption

Wood consumption has severely exploited the woodland and savanna trees of The Gambia. Most of the wood is used locally for timber, fuel and poles. A considerable amount of the wood resource, however, is destructively wasted in the process of clearing land for farming or in reclaiming land from long fallow periods.

The Forestry Division operates an underpowered and inefficient saw mill that saws about 17 percent of the total lumber production. Pit sawing produces about 9 percent and local villagers produce the remaining 74 percent of the lumber in rough hewn planks for construction and the boat building industry at Barra and Banjul (LRD, 1976). Most of the planking is currently from one species, mahogany (Khaya senegalensis). Rhun palm (Borassus aethiopum) is split and used extensively in rural house construction.

A 1975 1/ study indicated that about 90 percent of total wood consumption was as fuel or charcoal. The annual per capita consumption of forest products was 1.7 m^3. To obtain this quantity from existing woodland would require a mean annual increment of 2.2 cu m/ha. Data from similar climatic zones would suggest that 1.4 cu m/ha is the most that can be expected. Extrapolating the data indicates that almost 2 ha of woodland are required per capita lifetime.

Charcoal demands are also increasing in urban areas. The price of charcoal is quite high and forms a sizable portion of the family budget. Prices in January 1977 were about 14 bututs per kilo or 4 Dalasis per bag. Most charcoal is made in the traditional manner; however, some metal kilns owned by the Division of Forestry may be used to increase efficiency. Transport costs to the kiln site unfortunately are too high.

1/ Openshaw, K. 1973. The Gambia: A Wood Consumption Survey and Timber-trend Study. LRD, ODM, Tolworth, Surbiton, England

2. Export

There is little indication that timber export is important. Trees of export quality are very scattered and transportation to harvest them is nonexistent. LRD (1976) reported that a significant trade with Senegal existed with thousands of rhun palm rafters being exported annually. This trade is being suppressed to try to preserve the rapidly diminishing stock of palms.

3. Import

Gambia has a large net import of forest products with estimates exceeding 2200 m^3 per year.

4. Forest Management

The Forestry Division was established in 1950 and attempted to create a national forest program by establishing 66 forest parks for management of timber trees, rhun palm trees as well as some forest preserves. The total area established under the national forest system was approximately 34,029 ha. These forest parks were turned over to the Area Councils for maintenance and protection. Recently the parks were returned to control of the Division of Forestry.

Spot checks of 1972 aerial photos by the LRD project indicated that control and protection had not been adequate as evidenced by cleared areas within the forest boundaries and in two cases the entire forest park had been cleared prior to 1972.

5. Forest Legislation

No specific Forest Law exists; however, there is provision for protection and management of the nation's wood resources under Section 6 of the Lands Act Cap 103. The government has declared three tree species (Khaya senegalensis, Chlorophora regia and Borassus aethiopun) to be protected and making it illegal to fell them anywhere in the country, living or dead, without a permit.

Trees may not be cut in the forest parks without permits; however, outside the parks, excepting those protected by law, trees may be freely cut for domestic purposes.

There is no specific provision in the law for regulation or control of grazing in forest parks.

6. Forest Research

Experiments concerning the silvics and silviculture of trees with timber management potential have been conducted for the past 20 years.

A plant materials trial of 25 different tree species was established at the Forestry Division compound at Yundum. No statistical data is available on the results of these studies.

7. Forest Policy

The Cabinet recently endorsed a forest policy statement which included objectives of reserving and maintaining a national forest resource, promotion of tree planting, and development of the economic use of forest products. A statement of operating principles had been previously established by the Division of Forestry. These include the following:

1. To ensure sufficient supplies of forest products to meet the internal requirements of the country.

2. To maintain tree growth necessary for the prevention of erosion and maintenance of soil fertility.

3. Pilot schemes for experimental tree planting should be considered in selected forest reserve areas in each District.

4. Emphasis should be placed on the creation of reserves within existing parks for the artificial regeneration of rhum palms to meet local demands and the reservation of natural rhum palm stands outside the forest parks.

5. The possibility of creating fuel plantations to serve Banjul and the necessary areas should be investigated.

6. The development of a small pit-sawing industry should be encouraged where practicable.

7. The Forestry Division will encourage and assist sound forestry practices by District Authorities and private enterprise although it is accepted that the control of forest policy and operations with financial liability must remain the responsibility of Central Government.

8. Timber Inventory

No quantitative analysis exists of the current timber resource of The Gambia. The reconnaissance soil survey conducted in 1972 can be used to provide some generalized statements about suitability of areas for tree growth; however, the level of mapping is not adequate to provide site specific estimates of existing or potential timber production.

9. Structure

The Department suffers from inadequate financing and lack of trained middle and senior level staff for all aspects of forestry and forestry utilization.

BEST AVAILABLE DOCUMENT

ANNEX H - SECTION D

LAND RESOURCE AND USE EVALUATION, CLASSIFICATION AND CARTOGRAPHY

C. Land Resources Survey Evaluation, Classification and Cartography

1. Aerial Photos

Aerial photos of varying quality and scale have been taken in 1943, 1952 and 1972. The flight that is most complete and of highest quality is January 1972 at a scale of 1:25,000 (4 cm : 1 km or approx. 3 in:1 mile). Some special aerial photos of the alluvial bottomland were also taken at 1:10,000 in January 1972. Landsat images also exist. These frames were taken in late 1976 and early 1977. Copies of the photos are on file with the Land Resources Division, Overseas Development Ministry, Tolworth Tower, Surbiton, England. Sets of the 1972 photos are in The Gambia, however, these are spread throughout the country for use by various groups.

2. Soil Surveys

A reconnaissance level soil survey of the entire country has been recently published at a scale of 1:125,000 (LRD, 1976). Field mapping was conducted with 1972 (1:25,000) aerial photos. Soil series were established and described and chemical analysis were conducted.

The classification system for the survey is unique to the Gambian project. While the structure is strongly morphological, some utilitarian characteristics were also part of the classification scheme.

The actual mapping was completed on the basis of landscape form. The constituent soil series of the landscape form have been identified and a characteristic association developed from this form. Since the classification system used in The Gambia was indigenous to the project, the soil scientists attempted to relate the soil series to existing classifications [illegible]

BEST AVAILABLE DOCUMENT

The unique characteristics of the soils, however, added areas seldom considered, particularly in the American system. Some attempts were also made to match mapping lines between Gambia and Senegal. This proved to be of little value since Senegal was mapped under the French survey system (personal communication Ivan Anderson, 1976, ORD, OMD, Tolworth, Surbiton, England).

Vegetation Type Mapping

A vegetation type map was developed on contract with LRD and published by Division of Surveys, Banjul, in 1977. The maps are published at 1:50,000 and provide a good set of base maps for the entire country. However, the vegetation mapping is very broad and too general for any basic resource planning. The vegetation types indicate only forest cover, cultivated brush-fallow and wetland. One cannot clearly distinguish cultivated ground with forest cover from cultivated ground without forest cover.

3

ANNEX J.

TECHNICAL ANALYSES OF PROJECT COMPONENTS

5

PROJECT COMPONENT # 1

LAND RESOURCES AND USE EVALUATION, CLASSIFICATION AND CARTOGRAPHY

Grazing Areas Development and Management

Introduction

Traditional grazing areas of The Gambia can be divided into two distinct categories: (1) cultivated land that is usually grazed by small and large ruminants after crops are harvested, and (2) fallow lands, range, and woodland that are available for grazing whenever any forage exists.

The national herd is increasing and placing more and more grazing pressure on these lands. Traditional methods of grazing plus other manipulations of the land have established a chronic set of resource deterioration problems. The solution-or at least a start toward a solution-must use an inter-disciplinary approach for development of appropriate technology that can be provided to livestock owners and that will result in protection of the resource base and maintenance of the national herd at a productive level.

Major problems were identified through a series of meetings with members of 9 Livestock Owners Associations (LOA) at Essau, Farafenni, Pakali Nding, Basse, Fatoto and Kuntaur. In addition, individual livestock owners near Sapu and Keneba discussed their grazing problems during one-on-one personal interviews. Observations and review of previous literature completed the background information for the design of this component.

The chronic problems are lack of quality forage in sufficient quantity to meet maintenance requirements of large and small ruminants on a year-long basis and adequate livestock watering facilities.

Rains usually start during mid-June with vegetation reaching a suitable grazing height approximately 30-45 days later. By early June, the only remaining biomass is of little or no grazing value (high lignin and no protein) or unpalatable browse.

It has also been observed that changes in desirable grass species are taking place as a result of both human pressure and livestock pressure. High quality thatching grass, probably Hyperenia rufa, is disappearing. The villages are now shifting to other grasses. The continued cutting of the grass at the same stage of growth every year causes the plant to weaken and, therefore, no longer able to compete with the associated species in the community. Likewise, Andropogon guyanis has been observed to no longer grow abundantly in the MacCarthy Island Division where livestock numbers are large and grazing pressure heavy. While these are empirical observations by unskilled people, they provide some idea of problems that exist.

Annual broadcast burning of lands to clear old growth grasses or to clear fallow land of material before cultivating is also having some effect on vegetation composition. Many important pieces of information do not exist; however, it may be assumed that fire stimulation of growth is causing a reduced carbohydrate reserve in the crown and roots. Carbohydrate reserves stored in lower culms may also be destroyed by fire. Loss of these reserves reduces plant rigor and further weakens the plant. It is important to recognize that fire has a role in the Gambian savanna ecology; however, its use, as well as misuse, must be clearly understood.

Extensive bottomland areas that serve as critical dry season grazing lands are being shifted or are planned to be shifted to irrigated rice production. This has the potential to reduce up to 30,000 hectares of grazing during the most critical period of the year in those Divisions where the largest number of cattle are concentrated.

Purpose

Development and management of grazing areas is designed to support improved nutrition of large and small ruminants. It will also produce basic data necessary for the GOTG to develop resource management and land use policies. It will provide the beginning for improvement of the natural resource base and maintenance of that base at a level capable of sustaining needs of the resource users.

Personnel

This portion of the project will be directed by a professional with training and experience in plant ecology, range management and renewable natural resource planning. This position will be maintained through both Phase I and Phase II. It will be filled by an expatriate during Phase I and Phase II. There will be from 4 to 8 Gambian range management trained personnel who will be interacting with the team during Phase I. From this group or other potential sources one will be selected to receive advanced degree work in range management during Phase II. Input from short term (1-2 months) consultancies, as needed, will give emphasis to certain elements.

This person will have experience in planning and developing grazing resource management plans, in designing and conducting scientific inquiry in grazing land management, experience in resource inventory techniques, ecological analysis techniques, some experience in automated data processing, and sufficient training to handle botanical identification of indigenous and exotic plants of The Gambia using taxonomic texts. The individual will be providing applied training to recently graduated Gambian technicians as well as having some teaching responsibilities to agricultural assistants at senior high school level. Therefore the individual will have experience in both training and teaching.

One Peace Corps Volunteer with a botanical background, either a botany degree or a biology degree with botany minor, will be used during the first 2-3 years of the project to assist in botanical identification, specimen preservation and ecological mapping.

Activities

Livestock Water

Livestock watering points are currently being developed through UNDP (United Nations Development Program) at 28 locations in Upper River, MacCarthy Island and North Bank Divisions. The contract has been let for these wells (bore holes). Each watering point is being located within an approximate 10 miles radius from villages in areas with heavy livestock concentration.

Dappos Development

Traditional livestock routes, "dappos", have been used for centuries to move livestock to water in the dry season and to common grazing areas. Conflict exists between croppers who plant crops in the dappos and the herders who move stock over the dappos usually damaging the fields. The croppers usually claim that they clearly were outside the dappos, therefore, they should be paid damages. To overcome this problem, AHPD for the past two years has worked with villages to obtain agreement on the dappo boundary. Concrete pillars have been manufactured to place along the dappo border to ensure a permanent demarcation. Currently, however, most of the pillars are stock-piled at Abuko station awaiting sufficient transport to move them up-country. Transport will be provided by the project to haul the pillars to the dappos. A joint effort between the project, AHPD and the local members of villages and LOA's will be utilized to set up the pillars.

Long-range planning for rehabilitation and improvement of severely degraded stock routes will be initiated in the fifth year of Phase I.

Ecological Inventory

A base line inventory of existing plant communities will be started in the early stages of the project. Use of existing base data maps and reconnaissance soil survey will aid in developing this element. The first rainy season will be spent observing, developing species lists, sampling plant communities on a broad scale basis and becoming thoroughly familiar with the plants. Training in plant identification and plant yield sampling will also be provided to the AHPD range management personnel by the specialist. Development of this data will also be done in close coordination with the range conservationist from the Soil and Water Management Unit project.

It will be possible for a Peace Corps Volunteer to assist in collection of botanical specimens for the Yundum University and U.S. National Museum of Natural History (Smithsonian, Washington, D.C.) and British National Museum of Natural History (London) to establish a basis of scientific exchange between The Gambia, U.S. and England.

When the 1979-80 aerial photos and land use maps become available, intensive mapping of vegetation types based on an ecological classification of existing plant communities will be initiated. The AHPD range assistants will have sufficient on-the-job training to assist in carrying out a portion of this element. During the rainy season and the subsequent dry season when the initial inventory work is being done, samples of various species of grasses, forbs and shrubs will be collected for analysis by the forage nutrition lab. Training in collection and preservation of material will be scheduled and conducted by the forage agronomist and staff of the nutrient analysis lab.

Maintenance of the herbage yield records, computation and storage of this data will utilize the facility of a programmable calculator or preferably a mini, desk top, computer with approx 64,000 bytes of virtual memory and ability to utilize input-output from cassette tapes or/and floppy disks.

Grazing Land Management - Production Trials

A series of data development and forage adaptability trials will be established in various regions of the country. These regions can be delineated by the greater than 1200 mm mean annual precipitation, 1200-1000 mm m.a.p. and less than 1000 mm m.a.p. isohyte lines. Each of these areas will be represented by a set of four 10 acre fenced plots. Following improvement of vigor of the plants within the plots, some areas will be cleared of bush or thinned to observe changes in species composition. Other portions of the plots will be interseeded with exotic legumes and grasses. The actual design of the

scientific studies will be done by the range management and forage agronomy specialists on the project. Specific descriptions of forage and nutrition studies are in the technical descriptions for the components on improved crop and forage management and demonstration enterprise program.

Trial areas will be located on sites provided by members of Livestock Owners Associations. At designated periods, livestock will be allowed to graze the plots to study plant response and to illustrate values of regulated grazing programs. AHPD will also be involved to assist in determining the relationship of brush density to incidence of trypanosomiasis and/or tsetse fly populations.

Woodland Grazing Land Efforts

Grazing trials will be developed in woodland areas or forest parks to reduce potential fire problems. It will also be necessary to develop a data base on grazing susceptability of economically important trees, as well as needed spacing to enhance the growth and production of livestock forage. AHPD veterinarians will assist in assessing the potential hazards of grazing at times of the year when tsetse fly populations are high and constitute a health challenge to animals and humans.

One of the critical needs around urban areas is fuel wood. As human population continues to expand throughout the rural areas, this shortage will become more and more apparent. At the present time, however, rural areas are not faced with a fuel wood shortage. The range management specialist will work with the Forestry Department staff to institute evaluation of some shrubby legumes that can serve as browse during the dry season and also be used for fuel wood when needed. This would be closely collaborated with the animal nutritionist to evaluate palatability and nutrient quality of the browse species.

Management of Grazing Land Resources

The level of knowledge and data base for the natural resource systems being grazed by large and small ruminants in The Gambia is extremely sparse. Grazing of cattle by Fula herders has been taking place for many hundreds of years. Their inherent knowledge of plant-soil relationships within the area where they herd cattle is a tremendous resource for the range manager to draw upon when developing concepts or a framework for instituting resource management strategies. During early stages of this project the Socio-Economic unit will be conducting surveys and studies of sample villages, compounds and individuals. A section of these surveys will be oriented toward an improved data base about village grazing areas, the social or traditional concept of common grazing areas, and kinds of traditional grazing patterns, i.e., a "shotgun" pattern or a grazing circuit.

There also resides within West Africa a wealth of experience in grazing land management, both successes and failures. The range management specialist will schedule tours to meet with some of the individuals who are currently responsible for work in this area, for example:

Dr. Valenza, IMVET, Hahn Lab,
Dakar, Senegal

Dr. Peter De Leeuw
Institute of Agricultural Research
Samaru, Nigeria

Mr. Van Vortheizen
USAID
Abidjan, Ivory Coast

To effectively communicate with the Fula stockmen who are responsible for most of the actual work with the cattle, it is strongly recommended that the range management specialist become familiar with the Fula language and be able to communicate in simple phrases. FSI language instruction and Peace Corps Fula language instructors are available. Since a large amount of time will be spent in meetings with livestock owners and livestock herders, such a facility will greatly speed up the communication process by reducing translation to only one or at the most two additional languages, usually Serrehuli or Mandinka and Wolloff.

Toward the end of the first phase of the project the entire team will start identifying villages that would be interested in using their grazing areas to develop controlled or regulated grazing systems. Some of the MacCarthy Island Division villages have access to islands in the Gambia River. The village of Kuntaur, for example, has offered to work with the project in developing some form of regulated grazing on an island, if it is not converted to rice land.

Burning

Fire has always been recognized as an element in the savanna ecosystem. Most savanna vegetation has evolved mechanisms that allow it to survive periodic wildfire. However, when fire becomes a tool of man for annually clearing old growth, dense shrubs and stimulating growth, it becomes detrimental to the elements of that system most needed by man.

Portions of the grazing-forage trial areas will be burned to determine what influence fire has on the natural and exotic vegetation. These studies will not be initiated until the fourth and fifth year to allow sufficient time for recovery of the vegetation within the fenced areas. Emphasis will also be placed on control of brush fires by information and extension programs in coordination with the Forestry Department's program.

Year-long Forage Planning

As the grazing land-forage trials, the ecological survey and the forage quality analysis develop a data base for resource planning, the range specialist and forage specialist will work together to develop a simple methodology for range management assistants to use with villagers to determine their forage needs on a year-long basis. This will require the development of simple illustrations and information guides for the range management assistants to use when working with villages and compounds.

Natural Resource Planning Support

The range management specialist will be the primary resource person for providing expertise to the MANR in natural resource planning. There will be considerable interaction with the agricultural economists to develop resource allocation strategies for providing guidance to the Ministry and government to meet the demands for use of Gambia's limited natural resources.

Teaching and Training

Four Gambians are currently receiving training in range management in Kenya. Two will complete a two-year certificate course in March, 1979. Two will complete a 3-year diploma course in March, 1980. In addition, AHPD is attempting to enroll four additional students in range management programs in either Kenya or Nigeria for 2 or 3 year programs. These assistants will be available to work for AHPD in 1981 and 1982. The range management specialist will assist AHPD to develop training plans and will directly supervise their training with guidance from the training and communication specialist.

The complexity of the grazing land management program will require a well schooled Gambian counterpart. Currently there is no Gambian schooled in range management at the B.S. level. The range specialist will work with AHPD to identify an individual or two for B.S. or M.S. degree programs in range management or natural resource management. By the end of Phase II a Gambian counterpart will be ready to assume leadership.

The range management specialist, along with the other members of the project team will be teaching basic courses to Agricultural and Livestock Assistants and Inspectors. The range specialist will develop simple lesson plans for teaching basic concepts of grazing land management, utilizing trial plots at the various stations to provide hands-on demonstrations of these basic concepts. The lesson plans, illustrated materials and other teaching guides will be developed as a package that can be expanded and built upon over the life of the project and beyond.

Simple, basic extension-type programs about grazing land management will also be developed. This will require team effort so the material that is developed will be meaningful to the livestock owners and herders and fully integrated with the entire program. Films about grazing land management suitable for illustrating management similar to The Gambia will be obtained for showing by cinema vans.

Outputs

Effects of management of renewable natural resources, unlike other aspects of agriculture, are extremely difficult to measure in a short period of time. It is not unreasonable to expect only a little output in terms of grazing land improvement during the first twenty years after start of the project. However, it is important to note that a start must be made for the process to ever reach that point.

The outputs of Phase I will be primarily related to development of a data base from which management strategies may evolve. This data base will contain some quantitative components concerning the ecological inventory, such as annual herbage yield and species composition of various vegetation types, herbage response to various trial plots and species lists of dominant vegetation In addition, a large body of data from socioeconomic enquiries related to traditional, cultural and social aspects of existing grazing land processes will be developed.

Field training of 4-8 Gambian range management assistants will be well underway by the end of Phase I.

Field Equipment

Transportation	1 land rover 3 jerry cans
Bush Camp	1 camp cot and mosquito net water cans single burner stove
Vegetation Surveys	1 set botanical and taxonomic texts of W. Africa 2 plant presses, and pressing and drying material 10 tube-type 10 gram grayimetric scales 10 vegetation sampling frames, 1 m., square 10 grass shears 2 sets of range management texts and handbooks of U.S. Soil Conservation Services 4 sets of pocket stereoscopes 1 set of 1979-80 aerial photos 1000 vegetation sampling forms, e.g. (SCS-Range-417) 16HK minicomputer with floppy disk and cassette tape input and storage capability.

Dappo Development

2 Bedford trucks to transport pillars and other equipment to the dappos boundaries. Trucks will have several additional uses.

Grazing Land Management and Forage Trials

Fencing (including all fencing needs for Phase I). See Attachment 2.

Construction

3 meter woven wire	30 km
barbed wire	60 km
fence posts	10,500
staples	80,000

Maintenance

3 meter woven wire	3 km
barbed wire	6 km
fence posts	1050
staples	8000

Labor

3 fencing crews locally obtained

training	2 weeks
construction	3 months

1 maintenance crew temp. employment

training	1 week
maintenance	10 weeks/year ?

Equipment

tractor mounted post hole digger
shovels
hammers
fencing tools or wire cutters
3 fence stretchers (c-clamp style)
3 fence stretchers (2 pulley rope style)
Hauling posts, wire, etc. - 2 Bedford trucks
Tractor transport trailers

Training and Teaching

Supplies will be outlined under training and communication component.

Relationship to Other Components

Grazing areas development and management must be approached by an integrated team approach. Many of the activities are dependent upon close collaboration between team members.

Nutrient analysis, trial designs, evaluation of exotic and naturalized forages, comparison of plant responses to grazing will require a close working relationship between range management and forage agronomy specialists.

Much of the information and data base that will provide an understanding of the traditions of the Gambian herders will be developed through joint strategies, questionnaires and samples by the socio-economic group and the range management specialist.

Seed selection, development and multiplication for use in reseeding areas that have become severely depleted will be done by the forage agronomist to support the grazing areas development objective.

The land use classification and mapping component provides an initial cut for assisting in design of the ecological assessment, as well as providing a current aerial photo base for assessing the capabilities of the grazing resources.

It is inherently obvious that any development of grazing resources and management for sustained production is in direct support of the component of improved livestock production (both large and small ruminant).

As clearly stated in several sections of the activities, needs for training and communication are imperative due to the long-range nature of this component. Its ultimate success will rest on the proper design of training programs and educational methods to support a trained and skilled group of Gambians after the project has been completed.

Relationship to Other Ongoing Projects

This component will have close ties to several ongoing projects. The ecological survey work will enable the Soil and Water Management Unit to develop the vegetation suitability section of the proposed technical guide.

Also the 1980 aerial photos will be available for the SWMU to have cartographically enlarged to desired scales for use in intensive soil surveys.

The recent photos will be available for the FGR Forest Inventory team for use in the timber inventory.

The Rural Development Program which is strongly emphasizing crop production will relate to this component through the relationships of crop aftermath available for dry season feeding. The Soil and Water Management Unit will be working with farmers to incorporate crop residues to improve soil tilth and this project will be evaluating the quality and quantity of these same residues for livestock feed during the dry season. It is clear that these two projects will work closely together to determine the best allocations to meet both sets of needs.

United Nations Development Program has just let a contract to develop 28 livestock watering points in the middle districts of the country.

Gambian River Basin Studies Project is the vehicle of U.S. support for long-term development of the entire basin. A multi donor mission has produced alternative strategies for basin development. Following the studies project submitted to the Sennegambian High Commission, detailed projects will be proposed. This will entail intensive, detailed planning. Much of Gambia's developable land lies in the alluvial plain of the river. Such detailed planning will be assisted by the 1980 aerial photos that can be enlarged to larg scales for intensive planning of future land uses. Development of these river bottoms from grazing land to rice land will have serious impact on dry season grazing of cattle in that area. This in itself will require extensive study.

Evaluation (First 5-year period)

Dappos Development

Ninety percent of a-1 known dappos will be permanently demarcated by markers (pillars).

Ecological Inventory

A species list of all dominant and subdominant plants will be complete.

3 mounted sets of plant specimens will be complete with one set each sent to Smithsonian Museum, Washington, and British Museum, London.

An ecological classification of existing vegetation types will be developed.

200 forage yield samples will be completed. This will be representative of major ecological sites of The Gambia.

Four range management assistants will be trained in basic plant identification, plant yield sampling and vegetation mapping.

Mapping of ecological communities will be 40% complete.

Grazing Land Management Forage Production Trials

Four 10 acre trial plots will be established at 3 locations in The Gambia.

Study designs will be developed and at least 2 years data collected.

At least one field day will be conducted at each trial site with villagers brought in for the event.

Woodland Grazing

An empirical study will be conducted to test the susceptibility of important forest trees to grazing and burning at various stages of growth.

Potential fuel-browse species native to The Gambia will be identified. small plantation trial plan will be developed.

Management of Grazing Resources

A data base will be developed to describe the traditional methods and ways of grazing management.

Three villages will be identified for grazing manipulation trials in village grazing area.

A set of year-long forage strategies will be developed with plans for implementing on a limited basis.

Three range management movies from other countries and one set of visual aids explaining principles of grazing land management will be completed for use by extension and range assistants.

Burning

A brush fire prevention information program will be instituted and operational.

Attachment 1

Itemized Fencing Needs - Start of Phase I for All Components

Circumference Lin. feet			
21120	4	10 acre plots-LOA w/crossfence	660' x 4 sides x 4 x 2 crossfence
21120	4	10 acre plots-LOA "	
21120	4	10 acre plots-LOA "	
2640	1	10 acre plot Dappo	660' x 4
600	1/2	ac plot at Mixed Farm Center	148' x 4
600	1/2	ac plot at " " "	
600	1/2	ac plot at " " "	
600	1/2	ac plot at " " "	
600	1/2	ac plot at " " "	
840	1	ac nursery	209' x 4
840	1	ac seed mult.	
2370	2	ac graze trial	296' x 4 x 2 crossfence
2370	2	ac graze trial	
2370	2	ac graze trial	
2370	2	ac graze trial	
2370	2	ac graze trial	
840	1	ac nursery	209 x 4
840	1	ac seed mult	
2370	2	ac graze trial	296 x 4 x 2
2370	2	ac graze trial	
2370	2	ac graze trial	
2370	2	ac graze trial	
2370	2	ac graze trial	

96060 ft = 29,600 m or 30 km

All fencing will include:	3 m mesh wire
	2 rows of barb wire
fence post	2 m above ground
spaceing	3 m apart with corners braced internally

Total of 92 corners - 6 posts/corner to form the brace.

PROJECT COMPONENT # 3

IMPROVED CROP AND FORAGE PRODUCTION
AND MANAGEMENT

IMPROVED FORAGE PRODUCTION AND MANAGEMENT

Sown pastures do not exist in The Gambia. Improved grasses and legumes are not used in fallows, grazinglands and areas reserved for daily cutting and feeding to livestock. A small number of introduced forage and pasture species were recently observed in non-replicated small plots in several locations but no data were recorded regarding their contribution to increased feed supply for livestock. These observations, however, indicated that Townsville stylo (Stylosanthes humilis) and buffel grass (Cenchrus ciliaris) have potential and suggested that comprehensive studies of these and other introduced grasses and legumes are needed. The AID Mixed Farming Project will intervene in examining the potential of improved (introduced) grasses and legumes as livestock feed and use in the fallow.

The livestock industry in The Gambia is comprised of cattle tended by a semi-nomadic herdsman who may be part owner as well as sheep and goats tended by young boys close to the village (see Annex on The Livestock Sector). All livestock feed is derived from native or naturalized vegetation (largely grasses and forbes, including browse plants, but relatively few herbaceous legumes) and crop residues left in the field after harvest (largely sorghum and millet). Poor quality groundnut hay (haulms) is collected for feeding bullocks and old cattle for short-term fattening just prior to market. Most livestock receive no concentrates.

Grasses predominate as herbage available for grazing and is abundant shortly after the rains begin in June. Within six weeks many of them have elongated stems and developed flowering heads and by September all have begun to produce seeds. Quality declines rapidly and crude protein content drops below maintenance level in the early part of the dry season, which begins in late October or early November. Browse plants provide a high protein source during the dry period but usually become scarce toward the end of the season. All crop land is grazed after harvest as well as fallow and forest lands, except for government preserves. Cattle are moved into lowland grazing areas and swamp lands as the dry season progresses. By the end of the dry season the countryside is almost barren of low growing vegetation and many trees have been lopped to provide feedstuff.

The livestock population appears to keep pace with the increase in human population and both now exceed 500,000. Year-round grazing is inadequate at present and in some areas the more desirable graze and browse species have disappeared. Annual burning contributes to the deterioration of fallow and grazingland. As animal numbers increase, even greater stress will be placed on all lands devoted to grazing, on browse plants and on trees being lopped for feedstuff. At some point the pressure will be such that only unpalatable, low-growing shrubs predominate and large trees will disappear, unless drastic measures are taken to reverse the present trend. This process has already occurred in parts of the Sahel. Restricted grazing must be a part of any scheme to improve grazinglands and at the same time desirable species that increase acceptable herbage output must be employed.

The Improved Forage Production and Management Program will include studies to determine the potential of introduced grasses and legumes so as to increase total herbage available for grazing.

Program Purposes:

1. Increase livestock feed supply by developing an improved forage production and management program.

   a. Survey existing information and materials about improved forage species in The Gambia.

   b. Introduce and evaluate exotic tropical grass and legume species and cultivars.

2. Demonstrate the potential of extending dry season grazing by introducing a forage legume into the fallow and utilizing groun nut hay more effectively.

   a. Collaborate with the Department of Agriculture Agronomist in plot trials at Sapu.

   b. Establish a forage legume into the fallow at the farm level.

3. Establish observational trials under grazing in certain regions (collaboration with the Range Management Section).

4. Increase seed supplies of suitable and adaptable grass and legume species.

   a. Collaborate with the Seed Multiplication Officer in developi a seed production program.

5. Improve the capability of the Department of Animal Health and Production and the Department of Agriculture to deliver improved technology about improved forage production to livestock owners.

   a. Train Gambian Animal Husbandry Specialists in techniques of an integrated improved forage-livestock program.

Personnel:

1. One expatriate Forage Agronomist for a 5-year period having:

   a. Experience in field testing of forage grass and legume species, cultivars and selections (preferably those of a tropical or subtropical nature) and carrying out agronomic trials. No formalized studies have been made in The Gambia, thus this individual must have the capability of developing and initiating a new program. Some familiarity of soils and soil fertility would be helpful.

   b. Knowledge of crop rotations and how they fit into an integrated mixed farming system. At present the fallow period is an important component of the farming system in The Gambia. An important aspect of the Improved Forage Program will be introducing a forage legume into the fallow at the farm level and studying its effects and benefits.

c. Experience in designing and carrying out grazing trials, both on the experimental station and at the farm level.

d. Information about seed increase of forage grasses and legumes. Seed production in The Gambia will be rudimentary and harvesting will largely be done by hand labor. Still, there will be problems in processing and storing to be overcome.

e. Knowledge of techniques and methodologies of developing and delivering improved technology to farmers.

f. Capability of training Gambian Extension Assistants in delivering the improved technology to farmers (collaboration with the Training and Communications Section).

g. Skill in evaluating effectiveness of the improved forage program at the farmer level (collaboration with the Socio-Economic Section).

The Forage Agronomist will be attached to the Department of Animal Health and Production and headquartered at Abuko. It will be necessary, however, to work with persons in the Department of Agriculture. The Forage Agronomist will be expected to travel extensively within the country.

2. One Gambian counterpart having the equivalent of a Bachelor of Science degree in Agriculture. This individual should work with the Forage Agronomist for 18 to 24 months and then be trained abroad for a period up to two years in order to obtain a Master of Science degree in Forage Crop Husbandry. The most appropriate place for training in tropical forage crops would be in Queensland, Australia.

3. Two Peace Corps Volunteers (PCV's) with a B.S. in Agronomy having skills to:

a. Assist in establishing grass and legume introduction gardens, evaluating the potential of introduced species, cultivars and selections, and carrying out agronomic trials.

b. Train Gambian Extension Assistants in techniques and methodologies of delivering technology of improved forage practices to farmers (collaboration with the Training and Communications Section).

c. Work alongside the Extension Assistants at the farmer level.

d. Collect data and information at the farm level so as to evaluate the improved forage practices (collaboration with the Socio-Economic Section).

It is anticipated that one PCV will be assigned to work specifically with the introduction and evaluation of a forage legume into the fallow and the other PCV will be assigned to work specifically with improvement of groundnut hay.

The PCV's will be expected to live at one of the Mixed Farming Centers (MFC) or in a nearby village.

A six-month lead time will be necessary in recruiting the PCV' and allowing time for an intensive training course in The Gambia.

5. Gambian Field Staff:

a. Two grass-legume introduction garden worker supervisors to be located at Yundum. These individuals should be literate so as to be able to assist in keepin records and provide assistance in the agronomic trials.

b. Three or four permanent field workers to assist with maintenance of the introduction garden, agronomic trials, seed harve grazing trials, etc. (needed at Yundum and YBK).

c. Five to six temporary laborers, up to 6 months/year.

d. Up to 10 Extension Assistants, each with two or three demonstrators at as many MFC's to assist in the programs of introduction of a forage legume into the fallow and improvement of the quality and utilization of groundnut hay.

e. Two tractor drivers.

Activities:

Year 1

1. The Forage Agronomist should spend at least one month traveling throughout the country, being accompanied by the Gambian counterpart, so as to become familiar with the native and naturalized grasses and browse plants, systems of grazing and herding, MFC's, village life, the Livestock Owners Associations (attend meetings), etc. It would be advisable to have the Range Management Expert and Agricultural Economist to participate in these same travels.

2. Identification of present grass-legume introduction gardens and their utilization. Non-replicated introduction gardens with about six grasses and six legumes exist at Yundum, Sapu and YBK. Reportedly, these were established in 1974. It was not possible to determine whether previous studies have been made with introduced grasses and legumes. General observations were made about growth, seed production and persistance of the grasses and legumes at the three present sites. No data were recorded. At Yundum an effort was made to keep animals off the small plots but grazing occurred at some times of the year. At the other two sites the plots were not fenced and animals frequently grazed the area, except perhaps for a short period after the rains began. Two species, Townsville stylo and buffel grass, appear to have performed well and hold potential for immediate use in The Gambia.

At all sites Townsville stylo has performed as an annual, volunteering each year from seeds that dropped to the soil and germinated when the rains began. This is a desirable trait since the dry season extends for eight months or more in some localities. In some areas of the tropics where the dry period is of shorter duration, Townsville stylo reacts as a short-lived perennial. At the Kwinella MFC the stylo was also observed to have volunteered each year and reportedly has performed the same at other centers. In fact, the legume has spread for a considerable distance from the site of the original plots, an indication of its adaptability to the climatological and ecological conditions in The Gambia. No records of herbage or seed yields exist for The Gambia but data in other tropical countries show that dry matter production ranges from 4 to 6 tons/ha and seed production exceeds 500 kg/ha. The legume is frequently used as "standing hay" with animals grazing the mature herbage and eating many of the seeds. Under such conditions, sufficient seeds fall to the ground to assure a volunteer stand in the subsequent season and many pass through the animal undigested. In fact, passage through the digestive tract permits scarification of the hard seed coat.

In 1977 several bags of seeds of Townsville stylo were harvested by one of the Animal Scientists in the Department of Animal Health and Production for sowing in a larger seed increase plot. It was suggested by the Team that all sites of the stylo within the country be fenced so as to harvest as large a quantity of seed as possible for further studies under grazing conditions and in the fallow.

In the three introduction nurseries (Yundum, Sapu and YBK) an introduction of Cenchrus ciliaris (buffel grass) has persisted since 1974 despite rather severe grazing and the prolonged dry season. In addition, plants have developed seeds in rather large quantities. The cultivar identification was not available. No forage or seed yield data have been taken. None-the-less, the selection shows promise as a potential grazing crop in the country. Again, it was suggested that the present areas be fenced and seeds harvested for further increase and additional studies.

Even this scant information about the Townsville stylo and buffal grass, however, will advance the Improved Forage Program immeasurably.

3. Establishment of grass-legume introduction gardens.

Adequate grass-legume nurseries need to be established with replication so that detailed data can be recorded, such as adaptation, persistence, herbage yields, response to cutting (simulated grazing), date of flowering and seeding, seed production, incidence of diseases and insects, effect of the dry season, persistence, etc. These plots can also be used to obtain herbage samples taken at different stages of growth for in vitro analysis in determining forage quality.

The present observational plots can be used to begin expansion of the introduction gardens by fencing and harvesting seeds. Additional seeds can be obtained from the FAO headquarters in Rome, The Cunningham Laboratory in Brisbane, Queensland, CIAT in Colombia, Plant Introduction Station in Georgia and commercial seed firms in Australia. Up to a year may be needed to acquire seeds from these sources.

In addition to evaluating introduced grasses and legumes, attention should be given to the productivity of native or naturalized grasses. This will be done in collaboration with the Range Management Expert.

Furthermore, browse plants need to be examined, both those within the country and others that could be introduced. Again, this will be collaborative with the Range Management Expert. Some discussion was held concerning the potential of Leucaena leucocephala as a grazing and browsing plant for supplemental protein. A few plants were observed in the observational nursery at Yundum but were inadequate to allow evaluation of this species. Further studies are needed, but it should be remembered that the species usually performs more optimally when annual rainfall exceeds 1250 mm, does not thrive in acid soils, requires a specialized Rhizobium for inoculation and demands care in early establishment because of slow seedling growth.

It is not recommended that the introduction nursery at Sapu be expanded. In fact, it probably should be abandoned since the present low-lying land area of the station is not representative of soils where most grazing occurs.

Use of Townsville stylo in the fallow.

A fallow period comprises a part of the present cropping system in The Gambia (see Annex on The Agricultural Sector). Two types of fallow exist: so-called short-term of 3 to 5 years between crops in which native or naturalized grasses, various herbaceous species

and low-growing woody plants are regenerated and the long-term fallow of 10 years plus, more distant from the compound, and in which trees and taller-growing shrubs occur along with some herbaceous species and a few grasses. No seedings are made into the fallow and no soil improvement practices are attempted. Both types of fallow are heavily grazed during the dry season and the vegetation usually burned on an annual basis. Furthermore, the fallow periods are being shortened because of population pressure and need for more crop land.

Townsville stylo has potential for use in the short-term fallow in The Gambia. Annual reseeding and persistence under grazing are favorable characteristics suited to the conditions of the present crop-fallow rotation. After the initial seeding and in subsequent volunteer crops a short period is needed in which no grazing occurs, or grazing is restricted. This is to allow seedling establishment and early vegetative growth. It should not be a problem since cattle are moved away from the compound and small ruminants are tethered or closely herded during the early part of the cropping season. Once seedlings are well established the stylo plants can be grazed. More herbage will be accumulated, of course, for dry season utilization with limited grazing. Quality of the herbage does not significantly decline with plant maturity as occurs with grasses.

During the first year a program should be developed for on-farm testing of Townsville stylo in the fallow. An effort should be made to harvest as many seeds of the stylo as possible from the sites where it is already established. A training program should be developed (collaboration with the Training and Communications Section) for two or three Extension Assistants and several demonstrators located at MFC's where the species now exists. They would be instructed in characteristics of the species and agronomic practices for growing the legume, its potential as a supplementary feed crop during the dry season, method of seed harvest, processing and storing on the farm, etc. It will then be the responsibility of the Extension Assistant to locate several farmer collaborators in village(s) near his respective MFC for launching a testing program in Year 2. A PCV will be involved in this aspsect of the forage program as well as the Agricultural Economist.

5. Use of groundnut hay.

The quality of groundnut hay as livestock feed can be greatly improved by care in handling during harvest and processing of the crop and during subsequent storage of the hay. Under the present method of lifting and threshing groundnuts most of the leaves are lost so that the hay consists largely of the stems or haulms. Little information is available regarding the use of groundnut hay other than it is collected, stored and fed to bullocks and fattening animals. A detailed study is needed to determine the method(s) used

in making of the hay, storage and utilization of the hay. One of the PCV's will be specifically assigned to this phase of the forage program and will work in close liason with the Agricultural Economist and selected Extension Assistants. A training course for the Extension Assistants will need to be organized in collaboration with the Training and Communications Section. Once the survey is made it is proposed that on-farm practices will be examined so as to improve quality of the groundnut hay.

6. Observational trials of improved grass and legume under grazing in comparison with the native and naturalized vegetation.

No information is available concerning the response of introduced grasses and legumes under grazing conditions in The Gambia nor the effect of restricted grazing on the existing vegetation. It is proposed that evaluational trials under grazing be established at the Yundum and YBK stations and at three sites representing different ecological conditions in the country. This will be a collaborative effort of the Improved Forage, Livestock and Range Management programs with input from the Socio-Economic Section.

The off-station trials were discussed by Team members in meetings with several Livestock Owners Associations. Members of the associations agreed that land could be made available and there would be no objection to fencing. Non-replicated treatments in paddocks of 4.0 ha might be as follows:

a. Naturally existing vegetation in an area where low-growing shrubs and herbaceous plants occur with few scattered trees; to be undisturbed other than fencing.

b. Same as above but thinning of some shrubs and undergrowth, anticipating that grass cover will be improved.

c. Same as b, except Townsville stylo oversown; there might be some soil disturbance such as light disk harrowing.

d. Same as b, except buffel grass oversown after light harrowing.

Cattle will be rented from the local Livestock Owners Association. Decisions regarding grazing time and intensity, cattle weights, pasture management, botanical composition, etc. will be jointly made by the Forage Agronomist, Range Management Expert and their counterparts. The Agricultural Economist will also have input in these studies.

In the first year more detailed plans are to be made, the three sites selected and discussions held with members of the Livestock Owners Associations.

Portable cattle weighing scales will be required to carry out these studies. Road conditions in the country are such, however, that they will need to be transported by a trailer that can also be used to move the tractors and equipment. It is expected that wooden posts can be obtained locally but erection of fences will be expedited by use of a tractor operated post-hole digger.

Similar trials will be carried out at the Yundum and YBK stations but perhaps using paddocks of 2.25 ha and adding one treatment of mixed Townsville stylo and buffel grass.

7. Regional testing of promising grasses and legumes.

Once the grass-legume introduction gardens have been established at Yundum and YBK and the species, cultivars, and selections partially evaluated, a limited number of the more promising materials can be placed in non-replicated regional observational plots at several MFC's. During the first year the Forage Agronomist will give consideration as to where these might be located and initiate discussions about methodology with Production Assistants at these sites.

8. Studies of potential fallow crops.

The Department of Agriculture Upland Agronomist located at Sapu plans to initiate experimental trials with several fallow crops, including forage legumes. The AID Forage Agronomist will collaborate in the development of these plans and maintain an interest in following progress of the studies.

9. Maize stover as livestock feed.

The Forage Agronomist will maintain liason with the Maize Agronomist so as to integrate use of maize residue as part of an effort to improve the overall livestock feed supply.

10. Use of forage trials for teaching.

Members of the Department of Animal Health and Production hold short courses and seminars for Livestock Assistants and participate in student teaching. The Forage Agronomist will utilize the grass and legume trials at Yundum to assist in these activities.

In addition, other members of the Animal Husbandry Section of the Department of Animal Health and Production will be given specialized instructions about plot management of grasses and legumes as well as utilization in the field.

Year 2

1. Increase seed harvest of Townsville stylo and buffel grass. Seeds will be harvested by hand labor. Mechanical harvesting of tropical grass and legumes is not as advanced as those of the temperate zone. It is practiced in Australia but not in other parts of the tropics and subtropics. Use of such equipment in The Gambia would not be economical at the present time.

   Seeds of Townsville stylo can be collected by cutting the mature plants and flailing with subsequent removal of stems. The seeds will be "trashy", i.e. mixed with leaves and fine stems but this will not interfere with storing or seeding. In fact, seeding will be easier since the seed coat has a hooked awn that causes seeds to clump together. Although many of the seeds (testa) are "hard", i.e. requiring scarification for germination, there are ample numbers that imbibe water without scarification so that an adequate stand occurs. The "hard seeds" will germinate after alternate wetting and drying when the rains begin.

   Seeds of buffel grass can be harvested by simply hand pulling them from the seed head. Each seed is enclosed by a husk with a crest of awns, making a group of seeds light and fluffy. The husk can be removed mechanically but this is not necessary under farm conditions. The seeds can be easily stored in burlap bags and shoul remain in storage for about six months to overcome dormancy.

   At some time the Forage Agronomist should discuss with the Seed Multiplication Officer the feasibility of including forage grasses and legumes in the overall seed increase program being developed at Sapu.

2. Continued expansion of the grass-legume introduction nurseries at Yundum and YBK, taking appropriate readings and data for evaluation purposes.

   Location of the more promising grasses and legumes at five or more MFC's in collaboration with Extension Assistants. These need not be replicated at a given MFC but will provide further information as regional trials.

   Seed increase plots of Townsville stylo and buffel grass could also be established at these MFC's.

3. Initiate studies with handling of groundnut hay to improve quality (time of lifting the groundnut plants from the soil; subsequent handling to reduce the time between lifting and threshing with an effort made to conserve a greater quantity of leaves; cutting tops at different stages of growth and at different heights above ground level, noting the effects on yields of nuts; determination of hay yields; quality of <u>in vitro</u> digestibility; etc.).

4. Initiate on-farm sowing of Townsville stylo into fallow land. The stylo can be oversown at any time during the dry season. Trampling of cattle over the soil surface will not damage the seeds but rather help in pushing the seeds into the soil for more direct moisture contact when rains begin.

   It probably would be advisable to begin this phase of the program at one MFC, but at several villages.

   Another approach to establishing the Townsville stylo would be to intersow with sorghum and millet at the time of the last weeding. Establishment and growth of the legume seedlings will be more risky than sowing after harvest because of shading and competition for water and nutrients.

   The Agricultural Economist should work closely with the PCV and Extension Assistant in these studies.

5. Establishment of the observational trials under grazing at Yundum and YBK and at one (perhaps two) at the village leval in collaboration with the Livestock Owners Association. Availability of seeds will be a constraint in getting the grazing studies underway. Thus, a concentrated effort must be made to collect as many seeds as possible during the first year.

   Observational trials at the village level will require a coordinated effort of the Forage Agronomist, Range Management Expert, and Agricultural Economist.

6. Agronomic studies, such as response to fertilizer, time of sowing, grass-legume mixtures, might be started at the Yundum station.

7. Continued collaboration with the Upland Agronomist at Sapu regarding use of improved forages in fallow trials under experimental conditions.

8. Further training of Extension Assistants for on-farm testing of Townsville stylo in fallows, improved quality of groundnut hay, and regional testing of grasses and legumes.

<u>Year 3</u>

1. Continued seed harvest of Townsville stylo and buffel grass and others that have shown promise; additional seed multiplication plots at MFC's; collaboration with Seed Multiplication Officer in developing a national seed increase program.

2. Establishment of additional regional tests of grasses and legumes at selected MFC's.

3. Continue observational trials under grazing and establish other trials (total of three) at village level.

4. Continue and expand studies with groundnut hay and its utilization in the compound.

5. Continue and expand on-farm studies of Townsville stylo in fallows; provide guidance to Extension Assistants in training farmers how to harvest, process and store seeds of Townsville stylo, as well as instruction in sowing seeds and managing the stylo in the fallow.

6. Other aspects of the program continued as noted in Year 2.

Years 4 and 5

Continued aspects as noted above; modifications of the program as deemed desirable; attention given to effect of Townsville stylo fallow on subsequent crop yields.

Outputs:

Some outputs to be derived from the forage crop improvement program are as follows:

1. Trained specialists in improved forage crops production and management at headquarters. These will exist at several levels. One Gambian will be trained abroad as a forage crops agronomist and will assume leadership of the Improved Forage Crops Program. Several other members of the Animal Husbandry Section and a number of Extension Assistants will receive instruction in grass and legume utilization and management as back-up support for the forage agronomist. Livestock Assistants will receive information about improved forages in short courses and seminars.

2. A body of knowledge will be accumulated about the potential increase of feedstuff using improved grass and legume species, cultivars and selections. This type of information does not exist in The Gambia. Such information will be derived from the grass-legume introduction gardens and regional tests, agronomic studies, on-farm testing and observational trials under grazing.

3. On-farm testing of Townsville stylo in the fallow period will show that increased herbage can be made available for dry season grazing and will benefit subsequent crop yields. Guidelines will be developed for establishment of improved cultivars on fallow land.

4. The value of improved quality of groundnut hay will be made available to livestock owners and keeprs.

5. Seeds of improved grasses and legumes will be produced within the country.

6. Information will be available on response of introduced grasses and legumes to applied fertilizers.

7. Techniques and methodologies for delivery of technology and information about improved forage crops and their utilization to farmers and to livestock owners and keepers will be developed. Simplified graphic materials for livestock owners and farmers will be available to illustrate the benefits of improved forages in mixed farming.

8. An interdisciplinary approach to the integration of mixed farming (crop and livestock components) will be illustrated through the coordinated efforts of the Forage Agronomist, Range Management Expert, Agricultural Economist, and Trainin and Communications Expert.

Inputs:

Inputs required for the success of the forage crop improvement program will be as follows:

1. One expatriate Forage Agronomist for a period of five years.

2. One Gambian trained abroad (at Masters level).

3. Two grass-legume introduction garden worker-supervisors, six or eight permanent field workers and 10 or 12 temporary laborers (divided between Yundum and YBK).

4. Local training of Gambian Extension Assistants. These individuals are presently stationed at MFC's but will require training in grass-legume regional trials, on-farm testing of Townsville stylo and improvement of groundnut hay, and in methods and techniques for delivering technology to farmers and livestock owners, as well as making follow-up studies and observations.

   At each of the MFC's where the collaborative forage program is to be located there will be two or three demonstrators to provide support for the Assistants. These people are also presently stationed at the MFC's.

5. Commodities, Equipment and Supplies:

   1 Land Rover with trailer hitch (assigned to Forage Agronomist).
   2 Massey-Ferguson (MF) 165 tractors (oil bath cleaner) with 3-point hitch and draw bar.

   2 Trailers suitable for use with MF tractor (for hauling fencing, posts, fertilizer, seeds, etc.)

2 Double-disk harrows suitable for use with MF tractors.
2 Post-hole diggers suitable for use with MF tractors.
2 Flat-bed trailers (80" x 15' bed - Eager Beaver Model PL-3, 3 ton capacity) - movement of equipment to grazing and fattening sites.
24 Motorbikes, Honda 90 (12 first year and 12 replacements).
2 Electric forage dryers (220 V), placed at Yundum and YBK (e.g. forced air circulation, Precision Science No. 31524, 30 x 24 x 32 inches, sold by Thelco).
25 Chatillon Dynomometer scales (25 lb capacity).
4 Toledo balances, 500 gm capacity, e.g. Model No. 3710 (Burrows Equip. Co.).
4 Triple-beam balances (25 lb capacity).
3000 Burlap bags, 100 lb capacity.
1000 Cloth bags, 25 lb capacity.
50 Hand scythes.
50 Garden rakes.
- Fund for purchase of seed, fertilizers, etc.
- Barbed wire and woven wire fence (listed in another section).
- At least six months will be needed between order of these items and delivery to The Gambia.
- Housing will be required for the Forage Agronomist and family.

Inter-relationship With Other Programs:

The Forage Agronomist will be attached to the Department of Animal Health and Production but will need to work closely with a Crops Agronomist designated by the Director of the Department of Agriculture in on-farm testing of Townsville stylo in the fallow and in improvement of groundnut hay. He will need to maintain close liason with a representative(s) of the Rural Development Project who will have a keen interest in these aspects of the program.

Studies of the improved (introduced) grasses and legumes will be of interest to those working with the Soil and Water Management Project. Thus, the Forage Agronomist should maintain close contact with them.

There will be a close working relationship with the Range Management Expert and Agricultural Economist in the evaluational trials of grasses and legumes under grazing. The Livestock Owners Associations will be involved with the trials carried out at the village level.

The Agricultural Economist will need to collaborate in the planning stages and throughout the periods of study of on-farm evaluation and testing of Townsville stylo in fallows and improvement of quality and utilization of groundnut hay.

A large component of the Forage Improvement Program will be training of Gambian Extension Assistants and demonstrators. Thus, the Forage Agronomist will be working closely with the AID Training and Communications Expert and with the Gambian Training Officers in the Department of Animal Health and Production and Department of Agriculture.

Evaluation:

It is assumed that improvement of the livestock sector will remain a high priority of the GOTG; that natural vegetation (native and naturalized grasses, herbaceous and woody plants) will remain the major source of feed supply but an effort will be expended to increase the quantity and quality of dry season grazing; improved (introduced) forages have potential for extending dry season grazing; technical capability for carrying out agronomic evaluation and grazing trials, development of training guidelines and graph: materials will exist among the project staff and be supplemented by short-term consultants; on-farm testing of Townsville stylo will show the benefits of using an improved legume during the fallow; evaluation of grasses and legumes under grazing at the village level will illustrate to livestock owners the benefits of restricted grazing to allow accumulation of higher quality herbage and the benefits of increased herbage during the dry season grazing.

The following criteria will be used to determine whether the purposes of the AID Forage Improvement Program have been accomplished:

1. Documentation of the potential production and persistance of improved (introduced) forage species on fallow land and their respons under grazing conditions.

    a. Farmers recognize benefits derived from using improved forage species during the fallow.

    b. More efficient utilization of fallow land by use of improved legumes and grasses.

2. Increased herbage available for dry season grazing.

    a. Livestock owners recognize the value of Townsville stylo in the fallow.

    b. Attitude of livestock owners to restricted grazing of improved forages during rainy season to allow accumulation of herbage for the dry season.

3. Seed multiplication scheme developed for improved forages and distribution to farmers and livestock owners.

4. Higher quality of groundnut hay as shown by chemical and *in vitro* analyses and more effective utilization as livestock feed on the farm.

5. Syllabus printed and used in training of Extension Assistants and demonstrators.

6. Simplified graphic materials made available to farmers and livestock owners to illustrate the benefits, establishment, management and use of improved forages.

7. Program under Gambian direction, including qualified Extension Assistants and demonstrators at the district level.

LOGICAL FRAMEWORK

Improved Forage Production and Management

A. Narrative Summary-

1. Program Goal:

   a. Increase livestock feed supply by development of an improved forage production and management program under controlled grazing.

   b. Demonstrate potential of extending dry season grazing by introducing a forage legume into fallow.

   c. Improve capability of Department of Animal Health and Production (DAHP) to deliver improved technology about improved forage production to livestock owners.

2. Project Purposes:

   a. Survey existing information about improved forage species.

   b. Introduce and evaluate exotic tropical grass and legume species and cultivars.

   c. Establish evaluation trials under fencing and grazing in selected regions.

   d. Establish forage legumes into fallow at compound level.

   e. Increase seed supplies of suitable and adaptable grass and legume species.

   f. Examine the possibility of improving quality and utilization of groundnut hay as animal feed.

3. Outputs:

   a. Trained animal husbandry specialists in improved forage crop management at headquarters and in the field.

   b. Knowledge about potential increase of feedstuff during the dry season using improved cultivars.

   c. Information on response of introduced grasses and legumes applied to fertilizers.

   d. Seed multiplication of improved forage cultivars.

   e. Evaluation of grazing trials with Livestock Owners Association

   f. On-farm testing of forage legume as a fallow crop.

   g. Higher quality of groundnut hay.

h. Guidelines for establishment of improved forage cultivars on fallow land.

4. Inputs - Activities and Types of Resources:

a. Long-term expatriate forage agronomist.

b. Short-term consultants.

c. Training of Gambian animal husbandry specialist abroad.

d. Local training of Extension Assistants.

e. Commodities and miscellaneous supplies.

f. Housing of U.S. forage agronomist.

B. Objectively Verifiable Indicators-

1. Measures of Goal Achievement:

a. Increased herbage available for dry season grazing.

b. More effective utilization of fallow land through establishment of improved grass and legume species.

c. Benefits derived from improved fallow on subsequent cash/food crop yields.

d. Livestock owners recognize benefits derived by using improved forage species during fallow.

2. Conditions that will indicate purpose has been achieved:

a. Documentation of the potential production and persistence of exotic forage species on fallow land and their response under grazing conditions.

b. Higher quality groundnut hay as shown by chemical analysis and *in vitro* studies.

c. Program under Gambian direction at divisional and district level.

d. Attitude of livestock owners to use of improved forages and to fencing for confinement of animals.

e. Simplified graphic material for livestock owners that illustrates benefits of improved forages and their establishment after cash/food crop.

f. Syllabus for training district Extension Assistants in techniques of establishment and management of improved forages.

3. Magnitude of outputs necessary and sufficient to achieve purpose:

   a. Printed guidelines for evaluating exotic forages in small plot trials, for establishment on fallow land, grazing management and graphics for livestock owners in adequate quantities.

   b. Three or four evaluational grazing trials with livestock owners to compare traditional and improved systems.

   c. 15-20 on-farm tests of forage legume during fallow.

   d. Three or four Assistant Animal Husbandry Officers trained.
      Five or six local assistants trained.
      One specialist trained abroad.

   e. Local seed supplies of improved grass and legume in quantities for distribution to farmers and livestock owners.

4. Level of Effort/Expenditure:

   a. One Forage Agronomist for 5 years @ $500,000.

   b. Funding of one Gambian for training abroad @ $15,000.

   c. Local inservice training.

   d. Commodities: 1 vehicle, 24 motorbikes, 2 tractors and equipment, 2 longbed trailers, seeds, fencing, animal and forage scales, household equipment $200,000.

   e. Construction of house $65,000.

   f. Local personnel support (2 forage introduction supervisors, 6 permanent employees at experiment stations, 8 agricultural demonstrators at MFC's, 2 tractor drivers, 3 permanent watchmen (grazing trials), 10 temporary laborers - 6 months/yr) @ _____.

C. Means of Verification-

1. Program goal:

   a. Yield data and observations of improved forages.

   b. Number of animals carried per acre on improved pasture versus traditional herding system.

   c. Seeds of improved forage species available for distribution to farmers and livestock owners.

   d. Interest of livestock owners in grazing demonstrations and requests for seeds of improved forages.

e. Interest of farmers in forage legume for fallow seeding.

2. Project Purposes:

a. DAHP budget.

b. AID evaluation of activities and effectiveness.

c. Review of short-term consultants.

d. Interviews with technicians of program and livestock owners.

3. Outputs:

a. Visits to experimental trials of exotic forage trials and grazing evaluational trials.

b. Collaboration of Seed Multiplication Officer and quantities of seeds produced.

c. Yield data of improved forage species.

d. Increased carrying capacity of improved pastures.

e. Feedback of district animal husbandry assistants in terms of effectiveness of program.

4. Inputs: Activities and types of :

a. AID controller records.

b. Project records and progress reports.

c. DAHP budget and reports.

D. Important Assumptions-

1. Concerning long-term value of program:

a. Increased feed supply during the dry season is the foundation of improved livestock industry in The Gambia.

b. Increased feed supply (forage) and controlled grazing will result in improved animal performance with need for fewer numbers of livestock.

c. Use of improved forage types during the fallow will aid soil conservation and augment soil fertility.

d. Improvement of the livestock sector will remain a high priority of the GOTG.

2. Affecting purpose to goal link:

   a. DAHP will provide adequate policy direction, budgetary support and coordination to enable the program to function effectively.

   b. Improved forage technology developed within the financial, physical and cultural means of the Gambian livestock owners.

   c. Technology developed will be accepted by livestock owners as being in their best interest as well as that of crop growers.

3. Affecting output to purpose link:

   Technical capability for carrying out agronomic evaluation and grazing demonstrational trials, development of training guidelines and graphic materials will exist among project staff and supplemented by short-term consultants.

   Grazing demonstrations will illustrate to livestock owners the benefits of confinement of animals to allow accumulation of higher quality herbage and the benefits of extended dry season grazing. Crop growers will be shown the benefits of improved forage during the fallow. Animal husbandry assistants will find the improved forage technology useful and valuable.

4. Affecting input to output link:

   a. DAHP will assign qualified staff to the improved forage program.

   b. Forage agronomist and DAHP officials will collaborate in selection of candidates and arrange for training abroad.

   c. Supplies, commodities and equipment can be scheduled, purchased and delivered on a timely basis.

   d. GOTG can and will provide complementary inputs (personnel, maintenance and support).

MAIZE IMPROVEMENT FOR INCREASED FOOD AND FEED PRODUCTION

Maize is already used for human food and holds potential as a livestock feedstuff in the Gambia, i.e. grain as a feed ration supplement and stover as a feed residue. Presently, maize is used for human consumption roasted on the cob in an immature stage and occasionally cooked as a mature grain. It has residual use as a feed grain at two commercial feed mills operated by the Gambian Produce Marketing Board. The Department of Agriculture in the GOTG inaugurated a cereal improvement program in 1973 using technological package programs in an effort to increase the yields of maize millets, sorghum and rice for human food production. They had some impact but have not been fully evaluated. This AID project proposes to intervene with a component to increase the production of maize as food and as a feed for livestock. The vast majority of the crop will be used for human food but use of maize as a residual feedstuff will provide an important commercial outlet for small farmer production.

Program Purposes:

1. Increase production of maize as a food grain by developing a technological package of improved practices.

   a. Integrate the improved maize technology into the on-going program of increased cereal production.

2. Collaborate with the Department of Agriculture Agronomist in maize cultivar testing and agronomic programs.

   a. Expand the maize cultivar testing into regional trials.

3. Collaborate with the Seed Multiplication Officer in seed increase of suitable and high yielding maize cultivars.

4. Demonstrate the potential of maize as a food grain and residual feedstuff.

   a. Assist in the training of Department of Agriculture Extension Assistants and demonstrators in delivering the technological package to farmers.
   b. Develop improved farm level technology for maize drying appropriate to expanded level of production.

Personnel:

1. One expatriate Maize Extension Agronomist for a 3-year period, having:

   a. Experience in field testing of maize cultivars and carrying out out agronomic trials.

   b. Knowledge of techniques and methodologies of developing and delivering improved technology to farmers.

   c. Capability of training Gambian Extension Assistants in delivering the technological package to farmers (collaboration with the Training and Communications Section).

d. Skill in evaluating the effectiveness of the program of improved maize production at the farmer level (collaboration with the Socio-Economic Section).

The Maize Agronomist will be attached to the Department of Agriculture and headquartered at the Yundum Agricultural Station. This individual will be expected to travel extensively within the country.

2. One Gambian counterpart having the equivalent of a Bachelor of Science degree in Agriculture. This individual should work with the maize agronomist for at least one year and then be trained abroad for a period up to two years, attaining a Master of Science in Agronomy.

3. One Peace Corps Volunteer (PCV) with a B.S. in Agronomy and having skills to:

a. Assist in carrying out cultivar and agronomic trials.

b. Train Gambian Extension Assistants in techniques and methodologies of delivering the maize technological package to farmers (collaboration with the Training and Communications Section).

c. Work alongside the Extension Assistants at the farm level.

d. Collect data and information at the farm level so as to evaluate the effectiveness of the technology package (collaboration with the Socio-Economics Section).

The PCV will be expected to live at one of the Mixed Farming Centers (MFC) or in a nearby village.

A six-month lead time will be necessary in recruiting the PCV and allowing time for an intensive training course in The Gambia.

4. Gambian Field Staff:

a. One Field Supervisor at Yundum to assist with varietal and agronomic testing, with seed multiplication and processing.

b. Two permanent laborers and three temporary laborers to assist with field tests at Yundum.

c. Up to 15 Extension Assistants, each with two or three demonstrators at as many MFC's to assist in regional testing of maize cultivars and location of on-farm studies.

Activities:

Year 1

1. The Maize Agronomist should spend at least one month traveling throughout the country, being accompanied by the Gambian counterpart, so as to become familiar with cereal growing, MFC's, ongoing cereal production package programs, traditional methods of growing maize, areas where maize is grown for harvest as mature grain, farmer interest in growing maize as a feed grain, potential market for maize as a feed grain, GPMB buying points, etc.

   Reportedly, a commercial-type feed mill is to be erected in Banjul under the supervision of GPMB. This will provide a market for maize as a feed grain. A government pricing policy is needed for feed grain but there has been reluctance on the part of GPMB to establish a pre-seasonal price. The GPMB buying points are widely scattered in some areas and not readily accessable to potential maize producers. Discussion is underway whereby the MFC's would serve as collecting and buying points. These and other factors need to be clarified. Without some comparison of the potential economics of maize versus groundnuts as cash crops, it is unlikely that the farmer will be willing to take the risk of growing maize for feed grain.

2. Maize Cultivar Testing:

   Two uplant agronomists, one a Gambian and the other a British expatriate, have been carrying out maize cultivar tests at the Sapu Station. These trials include improved types obtained from the West African Maize Testing Program and from the International Institute of Tropical Agriculture (IITA). Data from these studies showed that Nigerian Composites (NC) A and B were higher yielding than the local types, have the same yellow color and are acceptable by farmers. It is recommended that cultivars developed at the Institute of Agricultural Research, located at Samaru, Nigeria be included in the cultivar tests since climatological conditions are comparable to most of The Gambia.

   The AID Maize Extension Agronomist will collaborate with the two upland agronomists in expanding the cultivar testing at the Yundum Station. Some of the more promising cultivars will be placed in regional trials located at 10 or more MFC's. These probably would not be replicated at each MFC, largely serving as observational trials (yield data could be taken, however, using locations as replicates) and for training demonstrators who will be delivering the technological package of maize as a feed grain to local farmers in villages.

   The PCV will be involved in the regional testing of MFC's and in the training program.

3. Agronomic Studies:

Limited studies of fertilizer response and plant densities are underway at the Sapu Station. The AID Maize Agronomist will collaborate in locating such tests at Yundum.

4. Seed Multiplication of Superior Cultivars:

About four ha of NC A and B were grown at Yundum in 1977 for seed increase and distribution to farmers. A similar land area of these two types is anticipated in 1978. At the Yundum Station, however, there is no mechanical means of land preparation, it being necessary to request a tractor and equipment from the Sapu Station some 75 km away. Weeding and harvesting are accomplished by hand labor. The maize is dried in the sun and grain removed from the cob by a small proto-type sheller.

The Maize Agronomist, in collaboration with the Gambian counterpart, will assume leadership in seed increase of improved cultivars to be used in the technological package. This activity will be enhanced with the purchase of a tractor, plus equipment, and a small commercial sheller to be located at Yundum.

A Seed Multiplication Officer was recently appointed in the Department of Agriculture and stationed at Sapu. Eventually, seed increase of improved cultivars of all crops will be under his supervision. It is anticipated that the AID Maize Agronomist will assist in the planning and development of the maize seed increase program.

5. Technological Packages:

The AID program will concentrate on maize as a feed grain with the residue used as livestock feed. The Department of Agriculture has a cereal improvement program that includes maize as a food crop and uses the MFC's to contact farmers. Reportedly, some farmers allow grain to mature for home consumption and have expressed interest in growing grain commercially. The maize feed grain program will function within the framework of the on-going food grain program and as a complement. Apparently, farmers accept the NC B as a substitute for the local type and it is suitable as a food or feed grain. There are no improved cultivars of sorghum and millet, neither of which are grown commercially. In the present technological package the Department of Agriculture recommends that farmers use fertilizer for maize, but no recommendation is made for planting density. No follow-up is made to determine whether farmers use the fertilizer and no yield data are taken.

The maize feed grain technological package is to comprise an improved cultivar (NC A or B), fertilizer, planting density and information about harvesting and drying, with a follow-up scheme on the farm. Data regarding these components are available from

studies carried out at the Sapu Station and can be used as guidelines. Regional trials will provide additional information for the technological package.

The program will be implemented through MFC's as follows:

a. Extension Assistants at selected MFC's will supervise delivery of the technological package to farmers in villages. A training program held at Yundum will explain techniques, procedures and methodologies. This is to be organized and carried out by the Maize Agronomist in collaboration with AID Training and Communications Officer and their Gambian counterparts, along with the PCV.

b. Extension Assistants will be supported by demonstrators already assigned to the MFC's. The demonstrators must also receive training either at Yundum, Sapu or at the MFC's.

c. Extension Assistants will be responsible for selecting farmers to participate in the feed grain program, handling the distribution of seeds and fertilizer and supervising demonstrators in delivering information about sowing, cultivating, harvesting, drying, etc., and in making follow-up observations.

d. Seeds of the improved cultivar(s) will be supplied from Yundum and fertilizer through the Department of Cooperatives (seed to be repaid in kind and credit extended for purchase of fertilizer).

e. Graphics regarding planting, fertilizing, cultivating, harvesting and drying are to be prepared in collaboration with the Training Section for distribution to farmer-collaborators.

At selected MFC's grain yield data will be collected by taking samples from farmer fields where the technological package has been utilized and from fields where maize has been grown in the traditional manner. The PCV will be involved in this aspect of the program, along with the Socio-Economics Section.

6. Use of Maize Shellers:

Maize has not been grown as a feed grain in The Gambia, thus technology of harvesting, drying and storing on the farm does not exist. Shelling of mature grain for home use is largely done by hand, but recently a hand-fitted implement for removing kernels was introduced. Information about drying and storing maize on the farm is not available. In general, however, storage of grain-on-the-cob is more successful in the tropics than shelled grain because of fluctuating moisture conditions. A study will need to be made regarding storage conditions on the farm and the most appropriate form to use. The commercial feed mill can utilize maize as grain-on-the-cob or as shelled kernels.

If shelling is to be done on the farm for commercial marketing of grain, it would be advisable to introduce a small, simple hand sheller. Even if the maize is marketed as grain-on-the-cob, the sheller might be useful in removing kernels for home use. The hand shellers will also be useful in processing maize at the MFC's. In any event, some training as to their use will be needed.

7. Utilization of Maize Stover as Livestock Feed:

Growing maize as a feed grain will increase the amount of residue available as livestock feed. During harvest for grain the stalks no doubt would be cut and shocked (stooked) for preliminary grain drying. Afterwards, ears are removed by hand for further drying in the sun. The remaining stover could be moved into the compound and kept for dry season feeding. A survey is needed to determine the manner of maize stover disposal at the present time. It is unlikely that a training program will be needed to show its value as a feedstuff.

Year 2

It is unlikely that the Technological Package can be launched in Year 1 and the program would be planned for operation to begin at the farm level in Year 2. Hopefully, Extension Assistants at 10 MFC's could be ready for delivering the package to farmers, locating about 20 ha of improved maize in villages around each MFC. During FY 2 regional cultivar tests and agronomic studies will be continued, along with seed multiplication and training activities.

Year 3

The maize improvement program would be continued with an expansion of the Technological Package onto farms, using Extension Assistants at additional MFC's. In addition to comparative grain yield data of improved versus traditional systems, studies will be made as to the effectiveness of marketing maize as grain and of utilizing the stover as livestock feed on the farm (these activities in collaboration with the Socio-Economic and Livestock Sections).

Outputs:

Some outputs to be derived from the improvement program of maize as a feed grain are as follows:

1. Trained maize production and extension specialists at headquarters and in the field. Delivery of the Technological Package will require the training of 15 or more Extension Assistants.

2. Identification of improved maize cultivar(s) and agronomic practices for increased food and grain feed production. Any cultivar(s) selected should be of a dual-purpose type since farmers will continue to use maize as a food crop.

3. Seed supply of improved maize cultivars. Seed for distribution to farmers will be derived from the seed increase program at Yundum until the National Seed Multiplication scheme is underway at Sapu.

4. Identification of regions most appropriate for feed grain production and motivation of farmers to grow maize as a feed grain.

5. Guidelines for increasing yields of maize developed for use in delivering the Technological Package to farmers and graphics suitable for teaching farmers improved practices.

6. Supply of maize as a grain supplement in livestock rations. This will be enhanced by construction of a commercial feed mill by the GPMB.

7. Increased utilization of corn stover as livestock feed.

8. Increased maize production as a food crop. This will result as a spinoff of improved practices directed primarily toward farmers growing maize as feed grain.

Inputs:

Inputs required for success of the maize improvement program will be as follows:

1. One expatriate Maize Extension Agronomist for a period of three years.

2. One Gambian trained abroad (at Master's level).

3. Field supervisor, two permanent and three temporary employees at Yundum.

4. Local training of the Gambian Maize Extension Assistants (15 plus). These individuals are presently stationed at the MFC's but will require extra training in maize cultivar trials and in methods and techniques for delivering the Technological Package to farmers, as well as making follow-up studies and observations.

   At each of the MFC's where the maize program is located there will be two or three demonstrators to provide support for the Assistants. These individuals are also presently stationed at the MFC's.

5. Commodities, Equipment and Supplies:

1 Land Rover (assigned to the Maize Agronomist).

1 Massey-Ferguson (MF) 165 tractor (oil bath cleaner) with 3-point hitch and draw bar (placed at Yundum).

1 Trailer suitable for use with the MF tractor.

1 Double-disk harrow suitable for use wish the MF tractor.

1 Commercial-type (small scale) maize sheller (located at Yundum); e.g. Model 22 (Burrows Equipment Co.).

20 Motorbikes - Honda 90 (10 for 1st year and 10 replacements).

20 Chantillon Dynamometer scales, 25 lb capacity (for use at Yundum and MFC's).

2 Toledo balances, 500 gm capacity, e.g. Model No. 3710 (Burrows Equipment Co.) (located at Yundum).

2 Triple-beam balances (25 lb capacity).

3000 Burlap bags, 100 lb capacity.

1000 Cloth bags, 25 lb capacity.

50 Hand operated maize shellers (Hand Black Beauty Corn Sheller, Burrows, Equipment Co.).

1 Seed grader, e.g. High frame model 4-1000 (Burrows Equipment Co.)

- Revolving fund for fertilizer and maize shellers.

- At least six months will be needed between order of these items and delivery to The Gambia.

- Housing will be required for the Maize Agronomist and family.

Inter-relationship With Other Programs:

The AID technological Package Program will complement the on-going Cereals Package in the Department of Agriculture as well as that of the Rural Development Project. The former concentrates on maize, sorghum and millet as food crops and the latter on ground nuts as a cash crop and rice as a food crop. It will also involve the Department of Cooperatives in a revolving fund for purchase of fertilizer and maize shellers by farmers.

A large component of the AID Maize Improvement Program will be training of Gambian Extension Assistants and demonstrators. Thus, the Maize Agronomist will be working closely with the AID Training and Communication Officer and with the Gambian Training Officer in the Department of Agricul

Close association with the Socio-Economic Section will be needed in collecting information about the traditional methods of growing and utilizing maize, the response of farmers to adoption of improved practices, the economical impact of food grain maize, as feed grain. and the utilization of maize stover as a livestock feed.

It will be necessary for the Maize Agronomist to maintain liason with the GPMB about marketing maize as a feed grain and utilization of maize in feed grain rations.

The Maize Agronomist will collaborate with the Upland Agronomists in the Department of Agriculture who are involved in maize cultivar and agronomic trials.

The AID Livestock Nutritionist and his Gambian counterpart will assist in studies concerning the use of maize stover as livestock feed.

Evaluation:

It is assumed that a market for maize as a feed grain in livestock and poultry rations will be generated with the construction of a commercial feed mill; that highly productive cultivars will be encountered and adequate seed supplies will be produced in The Gambia; that improved seed grain production and technology can be developed within the financial, physical and cultural means of the Gambian farmer; that the technical capability for carrying out cultivar and fertility trials, delivery of the technological packages, developing training guidelines and graphic materials will exist among project staff; that on-farm maize trials will illustrate to farmers the benefits of improved cultivars and improved technology; that maize as a cash crop will complement its use as a food cereal.

The following criteria will be used to determine whether the purposes of the AID Maize Improvement Program have been accomplished:

1. Farmer acceptance of growing maize as a feed grain and adoption of improved cultivars and agronomic practices.

2. Higher yields of maize as a mature grain by collaborating farmers.

3. Adequate supply of maize as a grain supplement in production of feed rations.

4. Syllabus printed and used in training of Extension Assistants and demonstrators.

5. Simplified graphic materials made available to farmers for use of improved practices.

6. Scheme for seed multiplication of improved cultivars.

7. Availability of fertilizer and credit for its purchase.

8. Program under Gambian direction, including qualified Extension Assistants at the district level.

LOGICAL FRAMEWORK

Maize Improvement Program for Increased Food and Feed Production

Narrative Summary

1. Program Goal:

   a. Increase production of maize as a part of the GOTG cereal food improvement program.

   b. Demonstrate the potential of maize as a feed grain complement and residual feedstuff.

   c. Improve the capability of the Department of Agriculture to deliver improved maize production technology to farmers.

2. Project Purposes:

   a. Develop a technological package of improvement maize production as a food or feed grain.

   b. Collaborate with the Department of Agriculture maize cultivar testing and agronomic programs.

   c. Collaborate with the Department of Agriculture in carrying out regional trials at MFC's.

   d. Integrate the improved maize technology into the overall GOTG cereal Package Deal Program.

   e. Assist in the training of the Department of Agriculture cereal production and extension specialists.

   f. Collaborate with the Seed Multiplication Officer in seed increase of appropriate cultivar(s).

3. Outputs:

   a. Trained maize production and extension specialists at headquarters and in the field.

   b. Identification of improved maize cultivar and agronomic practices for increased food production and for grain feed production.

   c. Seed supply of improved maize cultivars.

   d. Guidelines for carrying out maize improvement trials and graphics suitable for teaching farmers improved practices.

   e. Identification of most appropriate region(s) for feed grain production.

   f. Supply of maize as grain supplement in livestock ration.

4. Inputs - Activities and Types of Resources:

   a. Long-term exptriate maize agronomist (3 years).

   b. Advanced training of Gambian Maize Agronomist.

   c. Local training of maize (cereal) production and extension specialists.

   d. Commodities and miscellaneous supplies.

   e. Housing for U.S. Maize Agronomist.

B. Objectively Verifiable Indicators

1. Measures of Goal Achievement:

   a. Adoption of improved agronomic practices and maize cultivar(s) by farmers.

   b. Higher yields of maize as a food and feed crop by collaborating farmers.

   c. Farmer acceptance of growing maize as a feed grain.

   d. Adequate supply of maize as a grain supplement in production of feed rations.

2. Conditions that will indicate purpose has been achieved:

   a. Documentation of improved maize cultivars more suitable for food and feed production.

   b. Program under Gambian direction comprising qualified production and extension agents at the district level.

   c. Syllabus printed and used in courses for training district production and extension agents.

   d. Simplified graphic materials made available to farmers for use in improved practices.

   e. Scheme for seed multiplication of improved cultivars.

   f. Availability of fertilizer and credit for purchase.

3. Magnitude of outputs necessary and sufficient techniques:

   a. Guidelines for training extension assistants sufficient for distribution in districts.

   b. Graphics for farmer use in adequate supply for distribution at district level.

c. Farmer cooperatives in 15 districts.

d. Adequate seed and fertilizer for 20 ha in each of 15 districts.

e. Trained extension agents and demonstrators in 15 districts.

4. Level of Effort/Expenditure for program:

a. One maize agronomist for 3 years @ $300,000.

b. One Gambian trained abroad for 2 years.

c. Local in-service training.

d. Commodities: 1 vehicle, 1 tractor and implements, 20 motorbikes, seeds, fungicide, scales, maize shellers, credit for fertilizer, household goods, @ $100,000.

e. Housing for maize agronomist @ $60,000.

C. Means of Verification

1. Program goal:

a. Yield data and observations of improved maize cultivars.

b. Increased yields on farmers' fields.

c. Requests by farmers for seeds of improved cultivars.

d. Observations by Extension Assistants.

2. Project purposes:

a. Department of Agriculture budget.

b. AID evaluation of activities and effectiveness.

c. Seeds of higher yielding cultivars available to feed grain maize growers.

d. Interviews with technicians of maize package production program.

3. Outputs:

a. Visits to regional maize trials and farmer cooperatives to evaluate results.

b. Collaboration of Seed Multiplication Officer and quantities of seeds produced.

c. Yield data of higher yielding cultivars.

d. Feedback of MFC assistants in terms of effectiveness of program.

4. Inputs: Activities and types of resources:

a. AID Controller records.

b. Project records and progress reports.

c. Department of Agriculture budget and reports.

D. Important Assumptions

1. Concerning long term value of programs:

a. Market demand for feed grain to be used in livestock and poultry rations.

b. Increased production of maize in areas suitable for growth as a feed grain.

c. Highly productive cultivar(s) will be encountered and adequate seed supplies will be produced in The Gambia.

d. Stover will be used as residue cattle feed.

2. Affecting purpose to goal link:

a. Department of Agriculture will provide adequate policy direction, complementary budgetary support and coordination to enable program to function effectively.

b. Improved feed grain production and technology developed within the financial, physical and cultural means of the Gambian farmers.

c. Technology developed will be accepted by farmers as being in their best interest.

3. Affecting outputs to purpose link:

a. Technical capability for carrying out cultivar evaluation and fertility trials and on-farm demonstrations, development of training guidelines and graphic materials will exist among project staff.

b. On-farm demonstrations will illustrate to maize growers the benefits of improved cultivar and technological package.

c. Maize as a cash crop will supplement its present use as a food cereal.

d. Agricultural assistants will find the improved technology useful and valuable in addition to their present skills.

4. Affecting input to output link:

   a. Department of Agriculture will assign quality staff to the maize feed grain program.

   b. U.S. maize agronomist and Gambian counterpart will develop, in collaboration with training specialist, appropriate training guides and arrange for in-service training.

   c. Supplies, commodities and equipment can be scheduled, purchased and delivered on a timely basis.

   d. Department of Agriculture will provide complementary inputs (personnel, maintenance and support).

PROJECT COMPONENT # 4

IMPROVED RURAL TECHNOLOGY

COMPONENT #4: IMPROVED RURAL TECHNOLOGY

Introduction:

Although the Gambia is a small country, a serious deterrent to its agriculture functioning efficiently is the absence of reliable means of transport on farms and from farms to marketing points. Human energy required to seek firewood and transport by hand is often a serious competition to energy available for planting, weeding and harvest of crops. Delays in arrival of crops at marketing points because of waiting for transport often result in loss of quality in groundnuts and other crops offered for sale. Much of the crop residues could be more effectively utilized for feeding small ruminants and cattle during the dry season provided the residues were brought to the compounds for protection from trampling and destruction by wandering herds of cattle.

Animal traction equipment for direct cropping activities could enhance total crop production and aid in reduction of peak labor needs. Likewise, animal power for farm transport of agricultural inputs and outputs will improve farm efficiency. The IBRD/RDP has an effective program for the use of credit to purchase animal traction equipment and also to a limited extent loans for the purchase of two-wheel carts. During Phase I of the RDP program, the farmer demand for animal-drawn farm carts has far exceeded the anticipated level, thus credit funds were readily used up. As pointed out in Annex G, Sec. B, the desire for ox carts was a high priority at the Livestock Owners Associations meetings.

Program Purposes:

1. Establish a revolving fund for use as commodity credit to expand resources on farms.

   A. Integrate the use of transport into mixed farming systems.

   B. Collaborate with Gambian Cooperative Union in the use of commodity credit.

2. Demonstrate that use of the "modified ox cart" can be effectively used to improve efficiency of farm operations.

3. Develop technology for improved livestock production methods.

   A. Establish compound units for storage of crop residues.

   B. Collaborate with the animal nutritionist in Department of Animal Health and Production in determining effect of storage systems on nutritive value of crop residues.

4. Improve the capability of the Department of Animal Health and Production to provide improved technology on the value of improved feeding in animal production.

   A. Train Livestock Assistants and Inspectors in efficient use of mixed-farm resources for animal production.

5. Demonstrate to LOA members improved methods on the use of their resources.

A. Conduct demonstrations in crop residue and forage preservation

B. Conduct demonstrations in the management and utilization of manure in maize production.

Personnel:

- One expatriate Agricultural Engineer for short-term (1 month/year for 2 years).

A. Experience in farm structures, particularly storage requirements for forages and grains. No attention has been given to even the simplest of storage systems, such as "hay stack" on farms; therefore, the individual must have the capability of working with inexperienced personnel and with locally available materials. Some familiarity with manure preservation is desirable.

B. Short-term visits have serious limitations in program development. The main objective of the engineering input will be to establish "demonstration units" on farms and set up guidelines for evaluation which will be executed by local Livestock Assistants and Peace Corps personnel.

The Agricultural Engineer will be attached to the Department of Animal Health and Production with Abuko as home base and will collaborate with the Division of Engineering of the Department of Agriculture. During visits the Engineer will be expected to make several presentations to the trainees for Livestock Assistants and Inspectors on methods for the preservation of crop residue and other crops on small farms. He will be expected to work with Livestock Assistants in conducting demonstrations for LOAs on: (a) the use of carts in transport and distribution of manure; (b) use of carts in transport of crop residues; (c) methods of improving farm storage of crop residues; and (d) construction of storage sheds maximizing the use of local materials.

2. One experienced Gambian Livestock Assistant counterpart having the equivalent of a BS degree in animal husbandry. This individual should work directly with the Engineer during visits and assume responsibility for the program for the interim. Assuming favorable response from the LOAs, the counterpart should be sent abroad for at least six months of applied training on farm structures.

3. Two Peace Corps Volunteers (PCVs): one with a BS in Agriculture and some experience in farm engineering, and the other a BS in the Social Science area, preferably Rural Development.

A. The PCVs will work as a team, therefore, should be on the site simultaneously during the period 1980-1982 of project implementation.

B. Both PCVs will be headquartered at YBK and will work with LOA members who purchase ox carts under the credit scheme. They will also conduct demonstrations for LOA groups on the multiple uses of ox carts to expand the efficiency of farm operations.

C. The PCV/Rural Development Specialist will have primary responsibility for identifying how and when interventions may be most appropriate in the traditional farming system; identification of personnel in the compounds as best contact for instruction on use of carts; and instruction of borrower on the responsibilities of credit.

D. The PCV/Agriculture will be responsible for guidance of farmers on the use of ox carts, the need for training of oxen, the importance of proper feeding of oxen, and the construction of storage facilities.

E. Train Gambian Livestock Assistants and Inspectors on techniques for improved use of potential feed resources and the handling and use of manures.

F. Organize and conduct demonstrations for LOAs.

G. Collect data and information at the farm level for use in evaluation of carts and storage as benefits to rural development. The PCVs will be expected to live at the YBK training center or in a nearby village.

Activities:

In the PID the farm cart program was projected only as a fund to become a revolving credit for loans to farmers to purchase carts. The Project Team took the position the cart program could be much more effective in the goals of the AID Project when coupled with education on the utilization of carts to partially enhance the livestock sector. Time did not permit development of the guidelines for the cart program; therefore, the initiation of the credit is delayed until 1980.

Year 1979-1980

The credit program for ox carts is projected to commence in Year 2. During the first year, the "multi-discipline" group of long term technicians is expected to draw up the program on "ox cart use"; establish administrative procedures through the Gambian Cooperative Union for handling the credit and payments; develop a plan to select cart recipients; and arrange to purchase 400 carts, complete with removable sides.

Year 1980-1981

Begin distribution of 400 carts to LOA members. Select groups of farmers in three or more LOAs as collaborators on the multi-use

of carts and the timing of use of carts to enhance the efficiency of labor and conservation of resources. PCVs will be on-site to begin the execution of the cart program. Demonstrations will be conducted at various LOAs, such as hauling and storage of rice straw, building of straw stacks, the application of manure to maize and other crops, composting of manure, methods of loading carts to maximize efficiency of animal power and training oxen for pulling carts. The extension agents working in the ox training program or the Mixed Farming Center will participate in the latter program.

The work of PCVs and Livestock Assistants should be conducted in collaboration with the Forage Agronomist, the Animal Nutritionist and the Agricultural Engineer so as to insure the use of the best recommended practices for crop residue storage and the utilization in harvest methods for groundnuts that may lead to the production of higher quality hay. Also included in the studies should be possible changes in the labor calendar and distribution of labor within the compounds which may result from the use of carts.

Year 1981-1982

Distribute 400 additional carts among other LOAs. Repeat procedures outlined for Year 1980-1981 with new group of farmers.

Year 1982-1984

Additional carts will be purchased with loan repayments, about 300 per year, and distributed as deemed most appropriate by project team in collaboration with the Gambian Credit Union and LOA representatives.

Continue aspects as indicated above with modifications as deemed desirable.

The project team of long-term technical specialists should consider studies of the "economics of carts on farms" so as to monitor the worthiness of the use of carts as an aid to rural development.

Outputs:

Among the derived outputs are:

1. Improved efficiency in the utilization of resources available on mixed-farms. On the premise that approximately half of the rice straw ans sorghum or millet stalks are lost due to trampling, deterioration or burning and the nutritive value of groundnut hay could be doubled by improved methods of harvest, increased attention to these areas could nearly double the feed resources available during the dry season.

2. Ox farmers (those owning only work oxen) will derive increased income from the sale of their excess plant residues to herders or utilize the residues as a partial feed resource for participation in the Deparment of Animal Health and Production's farm fattening of small ruminants and cattle.

3. Improved feeding of livestock.

4. Train Gambian farmers in the value of quality of feed for their livestock. Information on the value of higher quality of groundnut hay will be made available to both livestock and non-livestock owners.

5. Train Gambians in the use of manures for fertilizer in maize production.

6. Technology will become available from systematic studies of the possible contributions of transport and the benefits of storage and fertility that will be applicalbe to most all farms in The Gambia, as well as serve as base-line technology for application elsewhere.

Inputs:

The inputs will be:

1. One expatriate Agricultural Engineer for two person months.

2. One Gambian with training abroad (non-degree) in farm structures.

3. Two PCVs for two years to assist in cart program.

4. Local training of Livestock Assistants and Gambian Cooperative representatives; the former in the appropriate methods to demonstrate technology, and the latter in the administration of loans.

5. Commodities, Equipment and Supplies:

   A. $250,000 for the purchase of 800 ox carts at the rate of 400 per year for two years. The carts currently distributed under the Rural Development Project or purchased through private sources are flat bed, two-wheel carts. To increase flexibility of the carts, those distributed under the AID program will be modified to include removable or drop sides to increase load capacity. These will be more expensive - 650 Ds compared to the RDP price of 511 Ds. The AID program carts will be made available to farmers at 511 Ds ($245) as an inducement for participation in the farm demonstration trials. Of the $250,000 allocated, $52,800 will be absorbed by the fund ($66/cart)for modifications. Assuming 91% repayment schedule, $180,000 will eventually become a credit fund for ox carts to LOA members.

   B. Four motorbikes for transport of two PCVs and Gambian counterparts.

C. Fund for construction of demonstration units for crop storage on farms at the rate of $3,000/year for 4 years. (Labor provided by cooperating farmers).

Inter-Relationship With Other Programs:

The ox cart program will be under the supervision of the project team affiliated with the Ministry of Agriculture and Natural Resources. This group will need to collaborate in the planning stages and throughout the project period. The field workers (PCVs and Livestock Assistants) will be a part of the training unit at YKB and attached to the Department of Animal Health and Production.

The cart program will complement the farm equipment program of RDP. The program will also be one additional feature available to the LOAs to improve their participation in rural development.

From the standpoint of technology, the cart program must depend upon close collaboration with the Forage Agronomist for inputs. The project Agricultural Economist is expected to also collaborate closely in the assessment of the project. A component of the cart program will be training of Livestock Assistants and Extension Associates in interventions on mixed farms.

Evaluation:

The Government of The Gambia has made a commitment to the Livestock Owners Associations to attempt improvement of the livestock sector through provision of assistance in several ways. The main objective for working through the LOAs is to create awareness among livestock owners that they should be more responsive to supply and demand functions in their operations and the need for their inaugurating community action in both the conservation and production functions. The cart program will be one feature of a possible package available to LOAs which can serve as an incentive to farmers.

As pointed out in Annex G, Section B, there is much heterogeneity among livestock owners and/or herders in The Gambia. Four classes were identified. The cart program will provide direct benefits to the ox-farmer, the owner-operators and small ruminant owners, with indirect help to non-cattle owners (sales and feedstuffs) and contract herders (dry season feed resources).

Some criteria used to access achievement of goal will be:

1. Documentation of the contribution increased availability of farm transport will have on agricultural and livestock production.

   A. Farmers recognize benefit of marketing higher quality products

   B. Improved efficiency in the utilization of farm resources.

   C. Increased productivity and reduced mortality of livestock from poor nutrition.

D. Increased esprit de corps among livestock owners resulting from pride of ownership of carts.

2. Improved livestock nutrition.

   A. Livestock owners recognize increased viability among young cattle, better work capacity of bullocks and higher returns from small ruminants due to improved feed supplies during the dry season.

3. Increased crop yields.

   A. Farmers become aware of increased crop yields due to more selective use of manures.

4. Higher quality groundnut hay and other crop residues for sale in animal feeding.

5. Increased labor efficiency in providing compound needs, such as firewood, thatching and fencing.

6. Program of farmer assistance which will contribute to rural development.

Estimated Cost and Schedule of Expenditures for Commodities and Equipment in IMPROVED RURAL TECHNOLOGY

Item	Years ($000) 1	2	3	4	5	Estimated cost ($)
Technical assistance (short term)		10	10			20
Training abroad (6-months)			8			8
Equipment/Commodities		3				3
			- Revolving credit -			
Ox carts (800 @ $310)		125	125			250
Fund for construction farm crop residue storage units		3	3	3	3	12

PROJECT COMPONENT # 5

STRENGTHENING MINISTRY PLANNING AND EVALUATION CAPACITY

COMPONENT #5: STRENGTHENING MINISTRY PLANNING AND EVALUATION CAPACITY

I. INTRODUCTION

A farming system is the end result of a complex interaction between a number of interdependent components. In order to achieve it, an individual farmer, having access to certain specified quantities and qualities of the four factors of production (i.e., land, labor, capital and management), allocates them to three processes (i.e., crop, livestock and off-farm enterprises) in a manner which, within the knowledge he possesses, will optimize the attainment of the objectives toward which he is striving.

The types of, and physical potential of, livestock and crop enterprises will be determined by the technical element which reflects what the potential farming system can be and therefore provides the necessary condition for its presence. Constituents of the technical element include physical and biological factors which have been modified to some extent by man often as a result of technology development.

The farming system that actually evolves, however, is a subset of what is potentially possible as defined by the technical element. The determinant of the actual farming system is the human element which in effect provides the sufficient condition for the presence of a particular farming system. The human element can be subdivided into:

A. Exogenous Factors

This includes the social environment and other factors that are largely outside the control of the individual farmer but that will influence what he will and/or is able to do. Simplistically, these can be divided into at least four broad groups: community structures, norms, and beliefs; local institutions operating independent of external influences; external institutions or those usually supported directly or indirectly by developmental agencies (e.g., extension inputs, credit programs, input distribution systems, product marketing programs, etc.); and miscellaneous influences, such as population density, size and location of village, and the like.

B. Endogenous Factors

These include the individual decision maker and those other factors that are under his control. He is the person who ultimately decides on the farming system that will be found, being influenced and sometimes constrained by the technical element and exogenous factors.

This brief introduction serves to place in perspective the complexity involved in implementing the proposed Gambia Mixed Farming and Resource Management project and, hopefully, the holistic and integrative role to be played by the socio-economic unit in strengthening project and ministry planning and evaluation capacity.

The observations presented in this paper represent 11 days of work in The Gambia. It was not possible, therefore, to deal in detail with all the aspects that would have been desirable. The observations are based on reading, 1/ meetings with officials in MANR and other ministries, talks with individual farmers and Livestock Owner Association (LOA) members, field visits with RDP personnel and discussions with other team members.

II. THE GAMBIAN SITUATION

There is no question that there is genuine commitment on the part of the Gambian Government to improving the welfare of the farmer having livestock enterprises in his farming system. The uncertainty develops with respect to the unknowns in the "total" (i.e., technical and human) environment that exist with respect to the farming system, which contains livestock enterprises. These unknowns can be summarized as follows:

(a) Little is known about the traditional livestock production enterprises in The Gambia, for example, concerning herd management and structure, feeding regimes, inputs devoted to and products and incomes derived from livestock, decision making as it relates to livestock, etc. There are a number of conventional wisdom statements about some aspects of the above but virtually none have been subjected to rigorous empirical testing. Lack of information at the traditional level encompasses technical, social and economic matters and therefore includes knowledge on both the technical and human elements.

(b) Work undertaken by technical scientists in establishing the physical potential on improved systems is virtually non-existent 2/ (e.g., improved range management, improved animal nutrition, improving use of crop residues). Without a substantial core of basic knowledge about improved systems from the technical point of view, it is impossible to fully implement a development program with respect to livestock producers.

1/ From a socio-economic viewpoint, work undertaken by G. Lowe, the ODM/ Land Resources Division, M. Haswell, P. Weil and the Rural Development Project (RDP) proved to be of particular value.

2/ This is meant to apply to production aspects and not disease eradication where considerable success has been adieved. With reference to the latter, however, one area that is proving to be particularly difficult to achieve a substantial breakthrough in is with respect to trypanosomiasis.

(c) While there appears to have been a technical assessment of the availability of some of the programs related to livestock that are currently being implemented on a small scale, or about to be (e.g., maize cultivation, cattle fattening program, farm carts), there is little information from an economic or social point of view as to whether they are compatible with other parts of the existing farming system. This is particularly related to the endogenous factor component of the environment.

(d) Little information is available on some of the components that can be classified as exogenous factors. For example, almost nothing is known on the possible negative and/or positive effects of the marketing system and Livestock Owners Associations in commercializing the livestock industry.

The serious implications concerning these unknowns is further enhanced by the following problems:

(a) The problem of increasing population density with a concomitment increase in the livestock population is increasingly bringing into conflict the multiple uses of land for crops, livestock and forest. The problem in one sense is exacerbated in The Gambia, since unlike many other Sahelian countries where much of the livestock are still herded under nomadic and transhumant systems, the livestock are owned by the villagers themselves and feed for them has to be derived from within the village areas. Thus the conflict is largely internalized within villages. As a result it is possible that, if nothing is done, serious inequities could develop in the long run in such situations characterized by a diminishing area of common pasture land, a hierarchical though not at present oppressive village structure and a herd distribution whose size tends sometimes to be correlated with that hierarchy. It is reasonable to argue that it should be possible to avoid such an eventuality arising from the increasingly competitive relationship between livestock and crops. It is hoped that the proposed project will, by developing and implementing improved intensified production enterprises for livestock within modified farming systems, be able to re-establish the traditional complementary relationships that have existed between crops and livestock.

(b) The unknowns mentioned above contain constituents that cross discipline boundaries. This implies the absolute necessity of a multidisciplinary team working in an interdisciplinary setting. Unfortunately to date such teams operating in the area of farming systems that include livestock enterprises have not often been found. As a result, no well defined methodological approach exists. The proposed project with its livestock elements could therefore make a unique contribution in this area.

In summary, it would appear that the proposed Mixed Farming and Natural Resource Management project is urgently needed in The Gambia to provide continued diversification of the economy, traditionally so dependent on groundnuts, and to develop and implement improved systems for the farmer with livestock enterprises. However, the current situation in The Gambia means that much of the project work will have to have a developmental rather than simply an extension implementation focus.

III. PURPOSE

The basic purposes of the socio-economic unit optimally would appear to be to bridge the gaps between the components and disciplines represented in the project and to increase the efficiency of the developmental and implementation foci of the project, consistent with the over-riding goal of improving the economic well-being of rural people in The Gambia.

It is therefore reasonable to suggest that the socio-economic unit will play both an integrative as well as a service role and will tend to have a farm-level, micro-orientation.

More specifically, it is envisioned that the socio-economic unit should have the following functions:

A. Descriptive Function.

This would provide information of a quantitative and qualitative nature describing and analyzing the livestock and land use systems operating in The Gambia with the purpose of providing:

1. Information that will authoritatively delineate the characteristics of the land use systems and the constraints faced by livestock producers, from which it will be possible to develop relevant research priorities and/or implementation strategies.

2. Information relevant to the specific needs of the technical scientists which is required in the execution of their research programs.

3. As a result of the initial work, a backdrop against which the project can be monitored and evaluated during and after its execution.

B. Testing Function.

This function can be subdivided into:

1. Involving testing of the field level the particular technological packages developed by the project, in order to assess their relevancy to the local Gambian farmer. In effect these packages would be assessed in terms of their compatibility with the technical element, and endogenous and exogenous factors.

2. A less tangible form of testing would be looking at the potential of the "institutions" or exogenous factors serving the livestock producers to provide the necessary incentive and support to increase their level of economic well-being and to ensure an equitable distribution of that improved well-being.

The purpose of these two types of testing would be to ensure as far as possible an objective judgment of the potential value interventions based on them. Unsatisfactory results to the test would necessitate further work in making them more appropriate prior to the considerable commitment of resources required in implementation.

C. Monitoring Function.

This would involve monitoring changes over time as a result of project interventions. The purpose of this would be to:

1. Ascertain if the packages and/or strategies are proceeding as anticipated or whether some modification is necessary.

2. To assess the impact of the project and therefore provid a base for its evaluation.

D. Training Function.

The purpose of this would be to build up a core of Gambians with a micro socio-economic orientation in the Ministry of Agriculture and Natural Resources. An important aspect of the proposed project is that it would provide a unique opportunity for Gambians to receive practical experience in this area. Training would be provided at both the senior and junior levels.

IV. ACTIVITIES AND THEIR IMPLEMENTATION

A. Program.

An indicative program for the socio-economic unit in the first five years of the project (i.e., Phase I) is given in Figure 1. However, it should not be viewed as a complete program particularly in the later years of Phase I when the unit's priorities will be assigned on the basis of the results of previous years. In addition, to ensure coordination of the work of the socio-economic unit and its continued relevance to the needs of the project, there will be an extended planning session every six months to discuss and agree on an overall work plan, and shorter meetings every two months to discuss progress. Members invited to these meetings will include at a minimum:

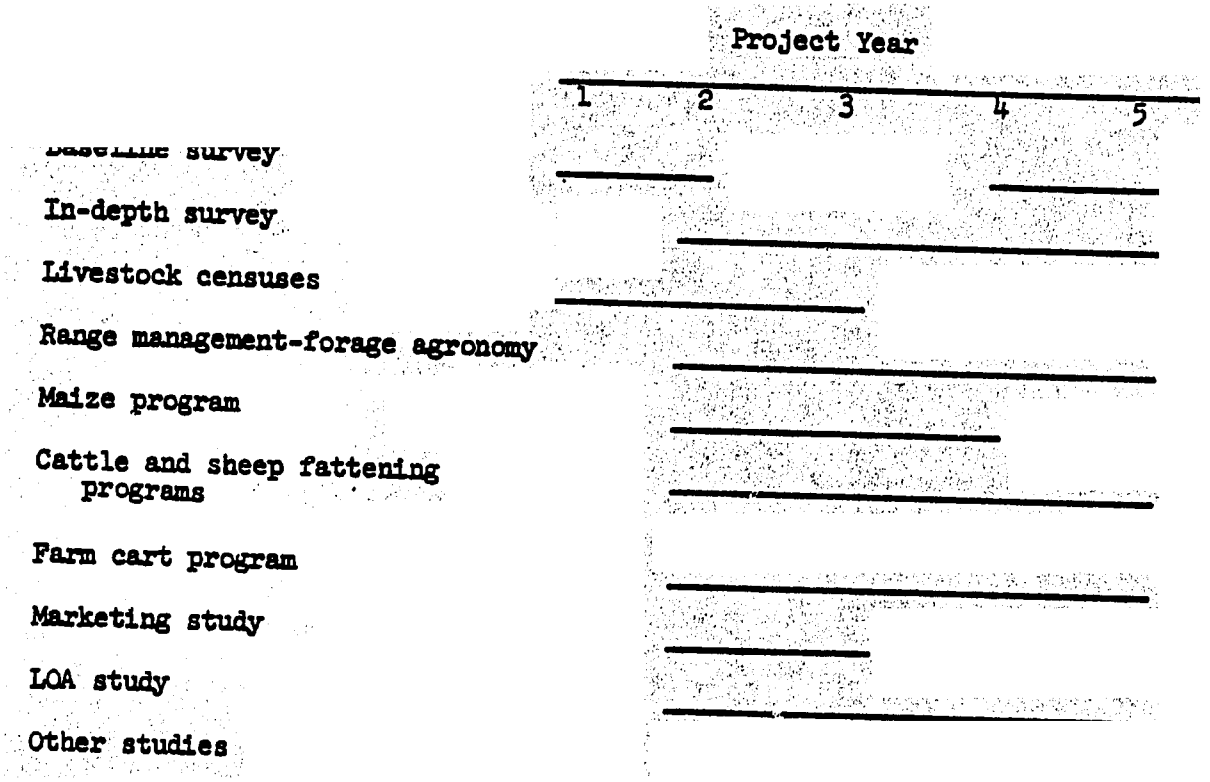
1. Senior staff working in the socio-economic unit.
2. Technical scientists representing the other components in the project.
3. Representatives from the RDP/SESIMU group and the UNDP technical group in the Ministry of Agriculture and Natural Resources.
4. Technicians from the AID Soil and Water Management Unit.
5. Representatives from The Gambia River Basin Commission.
6. Representatives of Livestock Owners Associations.

B. Personnel.

1. Senior Staff:

In terms of U.S. technicians, it is recommended that both an agricultural/livestock economist and rural sociologist be recruited and retained for the whole of Phase I of the project. Two of a number of reasons for advocating this are:

Figure 1. Tentative Program of the Socio-Economic Unit



a) Unlike many other projects, The Gambia Mixed Farming Project has, as discussed earlier, both developmental and implementational foci. The complexity of the foci and the desire to build in changes to the existing land use and livestock systems demands a detailed understanding of what is going on, what changes are likely to be acceptable and what are the best ways to introduce those changes. To provide such knowledge representatives of both sociology and agricultural/livestock economics need to be present.

b) The farming systems approach (i.e., "bottom up" rather than the traditional "top down" strategy) advocated in the project as a whole necessitates an "ex ante" rather than the traditional "ex post" role for the social scientists. Consequently not having representatives of both disciplines from the outset of the project would jeopardize the "ex ante" role.

2. Counterparts:

During the first phase attempts will be made to recruit three Gambian counterparts (i.e., two agricultural/livestock economists and one sociologist). Suggested times of recruitment and training are given in Figure 2.

3. Peace Corps Volunteers:

If it is not possible to recruit suitable Gambians in the short-term, it is proposed that Peace Corps Volunteers should be used as delineated in Figure 2. The objective of these individuals would be to provide a socio-economic link with the work undertaken by the technical scientists in the other components. It is anticipated that they would work full-time in the specified areas and a program of work would be drawn up by the technicians in the socio-economic unit in collaboration with the appropriate technical scientist. In the case of some of these assignments the major function will be descriptive in the early years (i.e., rangeland management and forage agronomy) while in other cases it is more likely the emphasis will be on testing and monitoring functions (i.e., work on maize, fattening and cart programs).

Figure 2. Senior Staffing on the Socio-Economic Component

		Year				
Agricultural/livestock Economist:	Gambian					
	Gambian					
	Expatriat					
Sociologist:	Gambian a					
	Expatriate					
Social scientists (PCV): Range management-forage agronomy						
Maize b/						
Fattening program						
Cart program						
Totals:						
	Gambians c/	2	1 (2)	1 (2)	2 (1)	2 (1)
	Expatriates	2	2	2	2	2
	PCV d/	-	3 (1)	3 (1)	2	2

a/ The broken line denotes time spent in overseas training (M.S. level)

b/ The PCV working on the maize program will be an agronomist but will administer relevant surveys designed by the staff of the socio-economic component.

c/ The figures in brackets represent those on overseas training

d/ The person in brackets refers to the maize agronomist.

4. Enumerators:

Although it is anticipated that existing Agricultural and Livestock Inspectors and Assistants may be able to help with some surveys, it is likely that due to other duties they will not be able to commit full-time to such activities. It is therefore necessary to build up a core of full-time enumerators with a minimum educational qualification of secondary IV level (i.e., the level used by RDP in similar tasks). There is a definite skill that develops with interviewing over time. Therefore in order to be able to recruit and keep suitable individuals, while at the same time making good use of experience gained, it is highly desirable to keep a core of such individuals over the duration of the project and beyond in the ministry structure. It is difficult to estimate exactly how many are required but tentatively 25 are suggested including statistical clerks and clerical help. Ideally the individuals recruited should be able to be interchangeable between interviewing in the field and analyzing duties in the office.

5. Short Term Consultants:

Consideration will be given to the following:

- A four week consultancy in the second year for a marketing economist to give advice for undertaking the marketing study (see Figure 1).

- A multidisciplinary review team at the end of year three to review the progress of the work and to give advice on the program planned for project years four and five. This will include a rural sociologist and agricultural/livestock economist. It would be preferable to have a general professional review and evaluation of the whole project at the same time thereby including representatives of each of the disciplines in the project. It is anticipated a one month period would be sufficient to undertake the above project evaluation.

C. Processing

Because of the necessity of building up Gambian capacity and the desirability of a quick turnaround in the analytical stages, it is important to establish a processing capacity in The Gambia. At present, there is no computer in The Gambia and the human population census, agricultural sample surveys, and other such work undertaken by the Directorate of Statistics

are either hand tabulated or sent to the United Kingdom for processing. Serious consideration will be given to purchase of a processing system for the project that can handle large amounts of data in The Gambia itself (see Section 7).

V. ACTIVITIES

The proposed time frame for the topics to receive consideration in Phase I is given in Figure 1. As has been stressed earlier, an attempt should be made to maximize the complementary relationships between the technical and social scientists, and that of the scientist with the implementation process in providing relevant technological and developmental strategies.

Some preliminary thoughts concerning each of the topics or activities are given to the following sections. However, before doing so, mention should be made of two surveys that are planned and that will provide a useful input into the work program of the socio-economic unit.

A. Baseline Study

The baseline study will have mainly a descriptive function and will be undertaken in project year 1 (i.e., 1979) and repeated in year 5 (i.e., 1983). The second time will give some indication of changes that had occurred since the beginning of the project. Realistically, in the light of earlier comments, it is reasonable to assume that these changes will have occurred largely as a result of factors outside the project itself rather than arising out of direct interventions by the project.

It is anticipated that the baseline study will be a single interview survey, consisting of a large sample with the aim of minimizing sampling errors and will concentrate on types of data that are quantitative (but 1/ have single point registered characteristics) and qualitative in nature.

The purpose of the survey is to obtain an idea of the characteristics of the farming systems in The Gambia in which livestock are incorporated. At the same time it will delineate in tentative terms the constraints faced in livestock production in each of the farming systems identified. Additional information of specific interest to individual technical scientists in developing their work programs, that are amenable to collection in a single

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1/ Such types of data (e.g., amount of fertilizer purchased last year) are less prone to high measurement errors than data of a continuous non-registered nature (e.g., family labor utilization throughout the year). The latter type referring to a particular year can only be collected accurately with a frequent interviewing approach.

interview survey, will also be incorporated in the survey design. Examples of such information are: numbers, species and individual owners of livestock; use of crop residues (haulm, stover, coos, rice straw and bran) for livestock in field or compound; fencing and burning; use of manure (which crops is it used on, whether it is burnt), etc.

There would be merit possibly in delineating livestock production systems in The Gambia in terms that will provide focal points for the technical scientists in executing their research programs. One such approach that is tentatively suggested that would be based initially on ecological criteria is as follows:

1. Stratify the estimated 800-1000 villages into three areas based on rainfall (i.e., less than 1,000 mms, 1,000-1,200 mms and more than 1200 mms). This corresponds with the three zones proposed for the grazing trials to be undertaken by the technical scientists.

2. Stratify the villages in each of the above areas into upland and colluvial 1/ villages. This breakdown will reflect differences in ethnic origin (i.e., Fula dominating in the former and Mandinka in the latter) and hence modes of production (i.e., ox farmers being more common in the colluvial villages, with owner-operated herds and contract herdsmen, who herd cattle belonging to individuals in the colluvial villages, being relatively more common in the upland villages). Differences between the two types of villages probably also reflect differences in the relative, if not absolute, significance of livestock in the incomes of the farmers. In the upland villages, the poorer soils and lower cash crop orientation are likely to result in greater reliance being placed on livestock as a source of income.

3. There would perhaps be merit in considering the addition of a seventh stratum which does not have an ecological orientation, but rather is one based on location. It is suggested that the peri-urban livestock producers may be developing somewhat different livestock production systems based on the nearness of the urban market and full time occupation of certain family members in the urban sector.

1/ That is, those villages where rice is grown under conditions other than upland.

Tentatively, it is suggested that a total of 500 compounds, scattered over the seven strata delineated above, should be included in the survey. This sample size approximates just over 2% of the rural compounds in The Gambia. The compounds would be allocated to individual strata in proportions that reflect the proportion of the population each stratum is of the total rural population in The Gambia. 1/ Within strata it is suggested that up to 10 compounds should be selected per village. 2/ Villages within individual strata would be randomly selected while the number of villages selected would depend on the number of compounds to be selected in the particular stratum. 3/ Compounds within villages could be randomly selected, or if a frame of compounds is not readily available, a systematic sampling approach could be utilized.

It is expected that the above stratification and sampling procedure will capture the heterogenity that exists in The Gambia with respect to land utilization and related livestock production enterprise systems. There may also be merit in considering post stratification in terms of the following: ox farmers, owner-operator herds, contract herdsmen, and sheep and goat owners. Although as discussed earlier there may be some differentiation arising from the pre-survey stratification system, there may be some merit in considering additional sub-divisions along these lines. Different technologies will be relevant for different ecological zones and types of producer (e.g., owner-operator, sheep and goat owners, etc.).

1/ The smaller average number of individuals in Fula compounds (i.e., in upland villages) than in Mandinka villages (i.e., in colluvial villages) will mean that the proportions of the total population in each stratum in the sample will differ from the true population proportions.

2/ The RDP project is finding an average of about 40 compounds in the colluvial villages. This figure is likely to be lower in the upland villages.

3/ Using the unrealistic assumption that number of compounds sampled in each stratum was the same, it would mean eight villages would be selected per stratum.

Since equity issues are considered important of the project, it is essential for the technical scientist to bear in mind the importance of developing technologies relevant to each sub-group in the population. A similar onus lies on the individuals responsible for the implementation stage in ensuring that everyone benefits. Although some of the interventions currently proposed in the project are not sub-group specific (e.g., well digging, livestock route demarcation) others are likely to be (e.g., farm carts, cattle fattening, etc.). 1/

Two final points that should be considered in implementing the baseline study are as follows:

1. It is essential to have a quick turn around in terms of making the results available. This is linked to the processing problem discussed elsewhere in the paper, and the possibility of precoding, as far as possible, the survey forms.

2. Discuss the proposed sampling design and survey forms prior to field testing, with the Directorate of Statistics and SESIMU personnel. Both groups have had substantial experience in carrying out agricultural surveys in The Gambia.

B. In-depth Survey

The in-depth survey, which will have descriptive, testing and possibly a small monitoring function, will be commenced in project year 2 (i.e., 1980) and continue throughout Phase I of the project.

The in-depth survey will be a frequent interview survey (i.e., two to three times per week), will consist of a small sample with the aim of minimizing measurement errors and will concentrate on both quantitative (i.e., including continuous non-registered or flow-type data) and qualitative types of data.

1/ Intuitively, a particularly vulnerable group in the long-run is likely to be the contract herdsmen. Eriksen has pointed out the conflict that is likely to arise between more modern management practices and multiple ownership of the herd. Such a system may prove to be incompatible with the intensified production systems and correspondingly modern management practices eventually envisaged in the project.

The major purpose of the survey will be to obtain an in-depth understanding of the main farming systems in The Gambia which incorporate livestock enterprises. This implies the necessity of including and accurately measuring data of a technical, economic and social nature. This will involve, amongst other things, collecting data on: inputs, including the flow of some of them, and output of each crop and livestock enterprise; estimates of the incomes derived from and productivity of livestock and crop enterprises and the relationships between them; detailed information on cash flows, decision making and on management practices particularly with reference to livestock; quantitative technical information requested by technical scientists (e.g., weights of crop residues, feeding data, etc.), etc. The continued nature of the surveys over the years, preferably with the same sample, will give a good indication of year to year variability. It is hoped that an additional purpose of the in-depth survey sample, especially in later years of Phase I, would be to use some of the sample, where appropriate, as testers of the proposed project interventions. The value of this lies in the fact that one of the criteria that has to be met in terms of expecting farmers to adopt an innovation, is that it should be compatible with the farming system. Through the in-depth survey, which would involve collecting data on the whole farming system, such a test is possible. In addition, if individual sampling units adopt the technology after the test phase, it will then be possible for a monitoring function to be included.

It is anticipated that the nature of data required in the in-depth survey, together with the quantities that will be generated will be such that the optimal sample size will be about 35 compounds (or dabadas). Such a small number would necessitate a purposive sampling technique. A final decision on the allocation of the sample would need to await the results of the baseline study. However, tentatively, assuming the seven strata suggested in the baseline study are equally significant, it is suggested that one village in each stratum should be selected for the in-depth survey and, within each village a sample of five compounds (or dabadas) should be purposively selected. 1/ If appropriate, consideration could be given to selecting a sample in each village representing each of the

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1/ It is necessary to cluster the sample within a few villages to cut down on the number of enumerators required. The RDP project is using one enumerator per 10 compounds but in the present context it is anticipated more data will be required and it is believed that a sample of five only would be desirable.

groups mentioned earlier (i.e., owner-operated head, sheep and goat owner 1/ etc.). 2/ A subjective decision will need to be made in selecting representative sample in each stratum. However, this can be aided to some extent, by using a sub-sample of that utilized in the baseline survey.

One further point that needs serious consideration is to whether the compound or dabada should be the sampling unit. It is anticipated that in the baseline study attention will be focussed on the compound. A final decision will have to be based on the results of the baseline study but one possibility to consider is the practice of SESIMU who interview on a dabada basis when the compound is large. In selecting the sampling unit it is necessary to select one that comes closest to a single decision-making, work and consumption unit.

C. Range Management and Forage Agronomy

As indicated earlier, it is anticipated that there would be a PCV who would work full time with the technical scientists collecting information that is pertinent to their work. During Phase I it is likely that PCV is likely to work primarily in the types of areas that fall under the rubric descriptive function. As much of the information required is likely to be attitudinal and perceptiveness there is merit in considering a rural sociologist for this post.

Data for fulfilling the needs of the technical scientists in this area whenever possible should be collected from the sample involved in the in-depth survey. However, it is likely that this will have to be complemented by, or supplemented with, special surveys on a larger sample with reference to specific topics (e.g., herdsmen's perception of the value of different plants, grazing practices, utilization of groundnut haulm, etc.).

1/ It is appreciated that the groups may not be entirely mutually exclusive.

2/ However, in the light of comments made under the baseline study selection it is likely that selection of representatives of each group in each village may not be appropriate.

The following three activities (i.e., (d), (e) and (f) have a significant testing component. It is suggested that, where possible, this testing function should be considered in two stages, as follows:

1. Testing at the farm level with the managerial input still being provided by the scientist. The test in this situation would give some idea of the possible performance of the technology in ideal managerial circumstances under farmers' conditions.

2. Farmer level testing with the managerial input now being provided by the farmers themselves. This is likely to give a more realistic idea of how the technology will perform under practical farming conditions.

Care should be taken to evaluate the proposed technology in terms of criteria that are important to the potential adopter, rather than in terms significant to the scientist alone. The potential adopters' criteria will hopefully emerge from the baseline and in-depth surveys and in discussions with farmers at the time the technology is being tested at the farm level. Economic profitability expressed in terms of both level and dependability; compatibility with the farming system; and exogenous factors are likely to be major criteria.

With reference to the farmers to be included in the testing, it is desirable that they should be representative of the population rather than simply the more cooperative ones, who in many environments tend to be the better farmers. Testing confined to such farmers will not give an estimate of the true value of the technology being investigated. As mentioned earlier, it would be desirable to include in the test farmers some of those participating in the in-depth survey.

D. Maize Program

In a sense this is likely to be one of the easiest constituents of the entire project. Trials at the farm level and farmer level testing are straight forward. The question mark that will develop is with reference to disposition of the product for human food and/or animal feed and provision of shellers and grinders. - The PCV agronomist working in this program would be provided with survey forms by the socio-economic group for evaluating the technology and obtaining information of specific interest to the technical scientist involved in the maize program.

E. Cattle and Sheep Fattening Program

At the present time this program is being implemented on a small scale with respect to cattle. Although there appears to be some evidence that it is technically feasible (i.e., at least for cattle) in a period of 90-120 days, no analysis has been undertaken to determine if it is economic or likely to be compatible with the farming system or exogenous factors (i.e., particularly the market if large increases in production via this route took place). It is anticipated the social scientist PCV would initially work with the animal science PCV to evaluate the system currently underway, following which consideration would be devoted to testing potentially improved systems.

F. The Farm Cart Program

It is anticipated that there will be no lack of demand for carts on the part of farmers since the cart is already commonly used in The Gambia. However, in the proposed project the traditional flat bed cart will be substituted by one that has the potential for sides. Since it is anticipated that during Phase I the second type is to be sold, at a subsidized rate, at the same rate as the first there is likely to be little problem with adoption. The test comes with encouraging greater efficiency in transporting materials, crops, crop residues and dung for improving the efficiency of the farming system as a whole. Efforts will be made to demonstrate and examine the degree to which the farming system can be improved as a result of using a cart (e.g., such as improving the nutrition level of animals). A social science PCV working with a technically oriented PCV will work on this program of examining and testing the potential of the cart, disseminating the carts through the LOA's, instructing farmers on their use and monitoring the use of the carts once disseminated.

G. The Marketing Study

The Gambia Mixed Farming project proposes ultimately to intensify the livestock production systems in the country. If successful, the results of this will be to monetise livestock production on the input side compared with a traditional production system which has not involved an outlay of cash. The new systems with the introduction of cash inputs into the production process will make the presence of a market for the product an even more critical issue than has traditionally been the case. Also intensified production systems, if successful, would result in more rapid gains and a

potentially higher off-take rate. 1/ There may be merit in offering higher producer prices to encourage higher off-take rates 2/ but then questions arise such as how price responsive are livestock producers, what is the price elasticity of demand for meat by consumers, what is the potential for exporting meat once imported meat is replaced by domestic production? Then there are issues such as is there a potential domestic market for quality differentiated meat (i.e., apart from the limited tourist market), would a weight by particular ages producer price scheme result in a higher take-off, better quality meat, and a market in the urban sector? At the present time there appear to be conflicting opinions about marketing issues including those above, and others such as cattle moving across the border into Senegal, the efficiency of the private trader in the marketing system, etc. Time has not permitted drawing up a detailed recommendation concerning a marketing study apart from strongly urging that it should receive considerable attention early in the project (i.e., year 2 in Figure 1). It has been recommended earlier in the paper that a short-term consultant in livestock marketing should be budgeted in the project to make suggestions on what studies should be undertaken. Resolving or at least clarifying some of the issues through a marketing study is potentially important in influencing the types of interventions that might be implemented later in the project.

H. Livestock Owners Association Study

The Livestock Owners Associations (LOA's) which are organized usually on a district level are of recent origin and provide a forum for expressing the opinions of livestock producers. They are also expected to play a key role as being the major institution through which the interventions will be channelled. Of key importance in this regard is to ascertain if this is indeed the appropriate vehicle through which interventions should be moved in terms of equitable access and benefits, etc. Also how will the dynamics of the relationships within the LOA's change over time? Would some of the interventions be more appropriately introduced at the village level, or through a more localized institution such as the Women's Associations currently being set up in the RDP area. Will the LOA's organized on a district level further enhance the hierarchical structure at the village level? These may well be contentious issues and indeed an open mind should be preserved concerning the value of the LOA's which to date appear to have had a good reputation. What is suggested is that since the LOA's are apparently destined to play such a key role in the project, it is important to undertake studies over the years to ascertain whether or not the issues raised above are or are becoming a problem.

1/ This off-take rate may in any case become higher over time simply because of the increasing inability of the traditional extensive system of livestock production to adequately sustain the livestock population given mounting pressures on the land resource.

2/ Estimates of current off-take rates vary between 7% and 12%.

I. Other Studies

There are a number of other studies that depending on what happens during Phase I may or may not be necessary. For example, as common land becomes more constrained the land tenure problem could become more pronounced. At present, land is vested in the control of the village chief (alkali). Monitoring land tenure changes, as the SESIMU group is doing, could become a significant issue. Other studies that, depending on circumstances, might be important in terms of the project, are those surrounding interventions that are not considered explicitly earlier in the paper. For example did conflicts arise over the dappo program and how were these solved, were the criteria used in selecting watering points satisfactory from a local point of view, etc.

VI. TEACHING AND TRAINING

A key role will need to be played by the expatriates in the socio-economic component in training Gambians with the firm understanding that at the end of the project there will be a core of trained Gambians to tal over their activities.

Training will be required at three levels:

(a) In the case of counterparts, training will be given by the expatriates in conducting and analyzing field surveys, while opportunities will be given for advanced degree training in overseas institutions.

(b) Short courses will be arranged by the socio-economic group for the enumerators on interviewing techniques, questionnaire administration, field measuring techniques and analytical methods using calculators.

(c) It is anticipated the relevant short courses will be offered to the LI's and LA;s when requested.

(d) It is understood that, when time permits, the expatriates if called upon to do so will help out on other projects under the jurisdiction of the Ministry of Agriculture and Natural Resources (MANR).

VII. EQUIPMENT

Vehicles:

	Project Year
2 long wheel base Landrovers	1980
2 short wheel base Landrovers	1980
8 jerry cans	1980
1 replacement long wheel base Land____	1982
1 replacement short wheel base Landrover	1982
25 motorbikes - to be sold to enumerators	1980
25 replacement motorbikes - to be sold to enumerators	1981

Field Equipment:

30 clipboards	1980
30 clipboards	1981
12 measuring wheels	1980
12 measuring tapes	1980
12 compasses	1980
30 shoulder bags	1980
30 shoulder bags	1981

Office Equipment:

3 manual typewriters (long carriage)	1980
3 cheap calculators	1980
3 cheap calculators	1982
3 cheap calculators with paper print	1980
3 cheap calculators with paper print	1980
2 Texas SR 59 with printer	1980
1 mimograph (duplicating) machine	1980
1 photocopier	1980

Processing Equipment:

1 Horizon North Star, 100 K, floppy discs teleprinter, CRS, visual display (Estimated cost $12,000)	1980

Possibilities of using SPSS on it should be investigated.

VIII. RELATIONSHIP TO OTHER COMPONENTS AND AID ACTIVITIES

One obvious potential linkage will be with the proposed Soil and Water Management Unit which will be developing a strategy for village level planning.

IX. RELATIONSHIP WITH NON-AID ON-GOING PROJECTS

Obviously, the strongest linkage should be with the SESIMU group in the RDP project. It is mandatory that in field work a close liaison be kept with the SESIMU and avenues explored for developing complementary relationships rather than duplicating work. Joint training sessions for enumerators (i.e., field rangers in the RDP) will be considered, while in terms of processing facilities it has been decided that a desk-top computer identical to that used by the RDP will be purchased. This will provide some degree of backup when one machine breaks down with mutual understanding being that both groups could use the same machine. The possibility will be explored that one technician is responsible for both machines.

Communication and cooperation between the two groups and the UNDP unit in MANR will be facilitated by having, as suggested earlier in the paper, representatives of SESIMU and UNDP attending the bi-monthly meetings of the socio-economic unit in the Gambia Mixed Farming Project. It is strongly recommended that this cooperation should be institutionalized so that at the end of the project there is a nucleus of Gambians under the umbrella of PPMU in MANR with expertise in undertaking micro-oriented socio-economic work.

X. CONCLUSION

It may appear that the proposed socio-economic component is large. It is certainly so in relation to the SESIMU group. However, while the RDP is essentially an implementation-type project, that of the proposed Gambia Mixed Farming Project is in Phase I more developmental in orientation. Far less is known about land use for livestock than the crop agriculture which RDP is emphasizing. In the light of differences in the "state of the arts" between the two projects the degree of emphasis on the socio-economic component in the proposed AID project is considered to be justified.

PROJECT COMPONENT # 6

AGRICULTURAL SKILLS TRAINING AND COMMUNICATIONS

COMPONENT #6: AGRICULTURAL SKILLS TRAINING AND COMMUNICATIONS PART I: TRAINING SUPPORT

I. INTRODUCTION

Training at the present time for entering Agricultural and Livestock Assistants and Inspectors consists mainly of formal academic course-work at a senior high school level. There is very little in-service training, that is, reviving the skills of those agents already trained. There is very little farmer-level training. There is specialized training in foreign univerisities for all Livestock Officers and some lower grade staff of the Department of Animal Health and Production. In 1977-1978, a "Training and Information Unit" was created within this Department but to date it has been staffed by only two men who continue their past teaching loads. The unit as yet has not fully defined its mandate or budgetary requirements. Finally, there is no specific coordinating body that devises training policy among the five Departments of the Ministry of Agriculture and Natural Resources.

The Department of Animal Health and Production at Abuko trains "Livestock Assistants" in two years and "Livestock Inspectors" in one year. There are currently 9 Assistants being trained who entered at the GCE "O" level at approximately age 18. They were selected from 20 candidates. The Inspector candidates are 40 in number, drawn from a pool of 340 applicants who took an entrance exam after, typically, four years of secondary school. There are two girls in the Assistant candidate group and three girls in the Inspector group. Nine Gambian instructors or "Livestock Officers" form the staff for both pre-service programs, each teaching according to his individual specialization, but without benefit of any overall syllabus. In the past much more instruction has concentrated on animal health - on disease, drugs, vaccinations, and meat inspection - than on animal nutrition, range management and general land use.

Once the Assistants and Inspectors complete their training, they are posted to the field at one of the livestock stations in the five Divisions: Upper River, McCarthy Island, Lower River, North Bank and Western. Currently there are 22 Livestock Assistants and 22 Livestock Inspectors in the field in the following distribution:

Division	Assistants	Inspectors
Upper River	6	16
McCarthy Island	8	13
Lower River	5	11
North Bank	2	8
Western	1	14
	22	62

Although no routine in-service instruction is available for this staff, the Department is anxious to plan some refresher courses. It was also clear from field visits that these agents consider themselves "abandoned" and would welcome the chance for further training.

There are currently 21 Gambians undergoing advanced training abroad. Their fields of study are much broader than the local staff training content These trainees, who will be valuable resources to the project when they return to the Department, are studying in the following fields:

Gambian Participant Trainees 1977-78

No. of Students	Field	Level	Place	Return
1	Livestock production	Diploma	UK	Oct. 78
1	Tropical veterinary medicine	Diploma	UK	Oct. 78
1	Poultry production	Diploma	UK	July 1979
1	Leather technology	Special course	UK	Aug. 1978
1	Veterinary medicine	D.V.M.	US	Sept. 1980
2	Animal husbandry	M.S.	US	Sept. 1980
1	Animal husbandry (pastures)	B.Science	Sierra Leone	July 1978
2	Range management	Diploma	Kenya	July 1980
2	Range management	Certificate	Kenya	Mar 1979
1	Animal health	Certificate	Kenya	Mar 1979
1	Animal health	Diploma	Kenya	July 1980
2	Lab. technology	Special course	Kenya	Dec. 1980
2	Animal production	Diploma	Ghana	Dec. 1978
1	Animal production	Diploma	Ghana	Dec. 1979
1	Animal science	Diploma	Nigeria	Jan. 1979
1	Veterinary medicine	B.Science	Nigeria	July 1981
21				

After having briefly presented the situation of livestock training in The Gambia and abroad and then having described the field staff deployment in-country for Livestock Assistats and Inspectors, we come to farmer training. There are two rural institutions through which farmers are able to receive information and training concerning livestock matters. The principal institution is the Livestock Owners' Associations, of which there are 42 in the country. The headquarters staff from Abuko and the station staffs in each Division regularly meet with the Associations to give them advice, listen to their questions and their grievances, perform demonstrations for them, or encourage them to initiate model animal husbandry projects. The second institution is the Mixed Farming Center, of which there are 26 in the country. Designed originally as demonstration plots and the field sub-stations for agricultural extension agents, it is now the intention of the Ministry to turn the centers into multi-purpose extension staff field stations to further the program objectives of all five Departments within Ministry. Ultimately Livestock Assistants will be posted to all the Mixed Farming Centers with counterparts from the Departments of Agriculture and Cooperation.

The communications media have been used to relay information to farmers and as a two-way feedback mechanism to share farmers' concerns with agricultural and livestock authorities in the capital. For several years now, a radio program, "Agric Bantaba," has been broadcast in local languages, drawn from edited tapes submitted by the Departments of Cooperation, Agriculture, and Animal Health and Production. Many of such tapes were recorded during Association meetings where livestock owners have taken advantage of the presence of Department staff who carry a tape recorder with them to get several of their gravest concerns off their chest. Through the several visits which the AID PID and PP teams have paid to Livestock Owners' Associations, a full inventory of livestock-related problems and attitudes has been established.

A second medium used to inform farmers has been the Mobile Cinema Van. The communications section of this document describes how films on livestock and agriculture subjects have been brought to scores of villages for evening viewing followed by discussion with extension agents. The cinema program and itinerary are fixed by the Extension Aids Unit - a ministerial communications support service available to all Departments - which assists in training and extension programs throughout the Ministry.

II. GOAL OF TRAINING SUPPORT

To improve the economic well-being of the Gambian farmer.

III. PURPOSES

1. To make good use of Gambians who have already received training in animal health, animal husbandry, and related subjects.

2. To provide better pre-service and expanded in-service training opportunities for Agricultural and Livestock Officers, Assistants and Inspectors.

3. To train a core of Livestock Officers to take over the management of the basic components of the project.

4. To restructure the syllabus of Agricultural and Livestock Assistant and Livestock Inspector training.

5. To provide a multidisciplinary focus in improved pre-service instruction.

6. To increase training opportunities for ox farmers, livestock owners, and contract herders.

7. To foster increased coordination in establishment of training objectives and policies among the Departments of the Ministry.

8. To assure a close association between the communications support services of the Extension Aids Unit and the training activities of the Departments.

IV. INPUTS AND OUTPUTS

A. Brief Description

TABLE I : TRAINING SUPPORT INPUTS AND OUTPUTS

Input	Output
1. Ten Gambian trainees from middle or high level staff candidates who will go abroad for training.	1. Ten trained Gambians who will reinforce Ministry staff and support project objectives.
2. Twenty Gambian trainees from lower level staff, whose training will be organized in The Gambia.	2. Twenty trained Gambian manual laborers or machine operators who will help provide sound infrastructure for project.
4. Six long-term U.S. technicians who will have a training and extension role under the project.	4. Improved multi-disciplinary training syallabi; better trained staff; establishment field training center and demonstration activities for farmers.
5. Thirteen Peace Corps Volunteers who will assist the U.S. technicians and also play a training role.	5. Collaboration with Gambian livestock field agents and enumerators.
6. Workshops in training and communications.	6. Initiation and exposure to basic principles of training strategies and communications support techniques for 50 Gambians during each workshop.
8. Provision of better training materials.	8. Improved pre-service and in-service instruction through the widespread use of audio-visual support materials.
9. Improved transport for staff with Honda motorbikes and one 22-passenger busses.	9. Increased mobility for Ministry staff in training and for participation in field trials, demonstrations and field days.

B. Commentary

1. Participant Training Abroad.

The following list of Gambian candidates for participant training in the U.S. or in African institutions has been discussed and approved in design meetings with Ministry officials. In most cases, the specific individuals have already been identified to undergo this training. The time frame has been carefully reviewed by Gambian authorities to take into consideration availability of substitute counterparts, the evolution of project components, and the general training and civil service staff situation in the Ministry. During the PID discussions, it was anticipated that most Gambian students could be trained at the Master's level. The Departments more recently, however, have confirmed that most of their known candidates are not sufficiently advanced to guarantee immediate success at this level. Therefore, degree level of course work will have to be evaluated by AID or the training institution on a case by case basis. Three of the candidates would do well to add to their two-year training program, a short course or observational tour in a second location. The forage agronomy student will spend six weeks in Australia to visit forage trials under climatic conditions similar to those of The Gambia. The rural sociology student will take the six-week course in his field offered in Wageningen, Holland. The extension education student will attend the six-week course in national agricultural development planning offered in Washington, D.C. under the Agricultural Sector Implementation Project (ASIP).

TABLE II : PARTICIPANT TRAINING SCHEDULE

Entry Level	Course Level	Speciality	Student Number	Training Duration	Training Location	Training Start	Prospective Assignment
Diploma	B.S. o M.S.	Forage Agronomy.	1	2 years plus observational tour in Australia	[illegible]	1980	Replace US Forage Agronomist/Abu[illegible]
Diploma	B.S.	Maize Agronomy	1	2 years	U.S.	1980	Replace US Ma[illegible] Agronomist/[illegible]
Diploma	B.S.	Extension education	1	2 years	U.S.	1979	Departmental Traini[illegible] and Information Uni[illegible] Abuko
B.S.	M.S.	Agricultural economic	2	2 years	U.S.	1980 &	PPMU/Ministry
B.S.	M.S.	Rural sociology	1	2 years plus observational tour in Holland	U.S.	1980	PPMU/Ministry
Diploma	B.A.	Communications	1	1 year	U.S.	1979	Extension Aids [illegible]
B.A. or B.S.	M.A.	Communications evaluation	1	2 years	U.S.	1980	Extension Aids [illegible]
Certificate	Associate Degree	Media technology and film production	1	1 year	Africa	1980	Extension Aids [illegible]
Certificate	Diploma	Graphics	1	1 year	Africa	1980	Extension Aids [illegible]

Total 10 Participant Trainees

15 Participant/years from 1979 to 1984

2. Local Training of Gambians.

In a few areas, training will be necessary in order to establish and maintain certain infrastructure basic to the project. The Government of The Gambia has declared its willingness and ability to finance and carry out all such training.

Person to be Trained	Purpose
a. One Honda mechanic at the Yundum Ministry motor pool.	Ministerial staff have reliable means of field transportation.
b. Two laboratory assistants at Civil Service Grade 1 for the feeds laboratory at Abuko.	Necessary chores of washing, grinding, preparing samples at the laboratory are done properly.
c. Twelve fence builders.	Correct installation of fencing on experimental plots.
d. 1 tractor driver/operator for post hole digger operation.	Correctly and efficiently dig post holes for fencing.
e. Three fence menders	Correctly maintain fences.
f. One operator for maize sheller at Yundum.	Efficiently prepare maize for livestock feed.

4. Training Role of the Six Long-term U.S. Technicians.

There will be six long-term U.S. technicians in The Gambia during the Phase I of the project:

Number	Specialty	Years
1	Forage agronomy	1980-1983
1	Maize agronomy	1980-1981
1	Range management	1980-1983
1	Agricultural/livestock economics	1980-1983
1	Rural sociology	1980-1983

It is described elsewhere in this paper how these specialists will relate to the individual project components. A fundamental commonality of their participation is that they will all play an important training role. Although they will have job descriptions which are keyed to component development and implementation, they will also have major responsibilities for counterpart training and improvement of pre-service and in-service staff training capability. These specialists will be recruited with the training role specifically in mind. The individual training roles will comprise the following elements:

Specialist	Training responsibilities
Forage agronomist	- Teach courses at Abuko for local staff. - Supervise extension work at YBK center.
Maize agronomist	- Teach at Yundum for Agricultural Assistants. - Hold seminars at YBK center for all staff. - Supervise regional testing at Mixed Farming Centers.

Range ecologist	- Teach local staff at Abuko, Yundum and YBK. - Train the Gambian range management specialists in the following fields: a. Plant identification b. Applied grazing and land management principles c. Herbage yield data collection . Photo identification . Conduct of field trials in grazing and forage quality evaluation.
Agriculture/livestock economist	A. Train unit enumerators for field data collection and analysis B. Teach local staff regarding: a. Use of survey methods b. Testing of technological packages.
Rural sociologist	A. Train unit enumerators B. Teach local staff: a. Survey and interviews techniques b. Testing of technological packages.

It is estimated that the classroom and field teaching responsibilities of these key project personnel will occupy from one quarter to one third of their time; consequently, these specialists, due to their high professional calibre, will contribute in a major way to the overall training component. The long-term technicians will work as a team in trying to instill an interdisciplinary focus into all their work and to foster this attitude in the relations with collaborating Departments, Offices, and Services of the Ministry. In particular, the interface between the technical scientists and the social scientists as in reaching farm populations and in developing behavior change strategies will be accentuated. Similarly, the close relationships between the natural resources - e.g., soil, water, plant communities - and livestock herding and grazing practices will be stressed. The interdisciplinary approach will be carried over to the syllabus planning for Ministry staff training. The Departments have been planning curriculum revisions in staff instruction programs and are looking forward to the professional suggestions of the long-term project technicians in this regard. A recommendation has been put forward to devise a common core syllabus which would be the introductory course work for all Assistant or Inspector level training in the Ministry. This will call for greatly increased collaboration in training between the two major Departments of the Ministry - i.e., Agriculture and Animal Health and Production. This recommendation will be reviewed in light of the human resources in various disciplines which will be available to broaden the present training programs. As it was mentioned above, the outputs from the long-term technicians' contribution to training will be in the form of improved institutional capability of the Ministry through pre-service and in-service staff training with one definite product being a revised syllabus for Assistant and Inspector training; and secondly the delivery of new information and proven techniques to farmers through field trials, demonstrations, and other extension activities.

4. The Skills Reinforcement Role for Peace Corps Volunteers.

Discussions have been held with the Peace Corps Director in The Gambia and Ministry officials concerning the recruitment of Peace Corps Volunteers to play key support roles - predominantly in the rural areas - in the project. The thirteen Volunteers currently proposed for the following positions:

Peace Corps Volunteers

Field	Suggested Posting	Service Dates	Training Role
1. Forage agronomy	An up-country Mixed Farming Center	1980-84	Train livestock and agricultural exension agents to perform studies on groundnut feed supplements for livestock.
2. Forage agronomy	A second Mixed Farming Center	1980-84	Train livestock and agricultural extension agents to perform on-farm testing of legumes in fallow rotations.
3. Forage agronomy	Village-level	1980-84	Collaborate with agricultural and livestock extension agents and train farmers to help evaluate trials of traditional and improved vegetative covers for animal feed.
4. Agriculture	YBK Center and area	980-82	Train YBK staff in the setting up demonstrations of farm cart use for Livestock Owners Associations.
5. Social science research	YBK Center and area	980-82	Train YBK staff and enumerators recruited by the socio-economic unit in field research concerning attitude surveys and effectiveness testing.
6. Animal nutrition	YBK Center and area	980-84	Train YBK staff and livestock extension workers to introduce livestock fattening schemes.
7. Social science research	YBK Center and area	980-84	Train YBK staff, Department extension agents, and enumerators in field research concerning attitude survey and effectiveness testing.
8. Animal nutrition	Yundum/Abuk	979-83	Train Livestock Assistants and Inspectors in field sample collection and laboratory forage and feed evaluations.
9. Animal nutrition	YBK Center and area	1979-83	Train YBK staff and livestock extension agents in field sample collection and laboratory forage and feed evaluations

Field	Suggested Posting	Service Dates	Training Role
10. Range ecology	YBK/Sapu area	1981-85	Train Gambian range management specialists in plant identification and carrying out research trials on local ecology.
11. Social science research	YBK/Sapu area	1981-85	Train Gambian range management specialists and enumerators in field research on farmer attitudes toward range management systems.
12. Graphics	EAU/Yundum	1980-84	Train counterparts and collaborate with Department liaison representatives in the production of graphic materials for training and extension activities.
13. Communications evaluation	EAU/Yundum	1979-83	Train Department liaison representatives; agricultural and livestock extension agents; and mobile cinema van driver/operators in simple methods of feedback data collection; train EAU counterparts in data analysis.

An important feature in Peace Corps Volunteer participation will be the interface between the technical scientists and the social scientists who together in teams would conceive of and implement testing activities on farmer attitudes and practices. In their training responsibilities likewise the "team teaching" approach will be used in order to help foster the broad interdisciplinary approach to problem-solving that constitutes one of the strong philosophical underpinnings of the project.

5. Eight Workshops in Training and Communications.

The five workshops on communications subjects are described in the following section on communications support. Basically their largest audience is the staff of Extension Aids Unit; the Film Unit; the Rural And Farm Broadcasting Unit of Radio Gambia; and the liaison representatives from the Ministry Departments. The training element from these annual workshops will consist of the following: identification of specific communications problems; consulting relevant documentation; elaborating elements for a national communications policy; enlisting the support of central and field Ministry personnel to help improve communications network.

In late 1981, there will be one workshop on training, organized by the Agricultural Sector Implementation Project in Washington, D.C. The participant trainee in extension education will have taken their six-week course in development planning and training and will act as chief Gambian organizer and co-leader of the workshop upon his return from training. The purpose of the workshop is two-fold:

A. To bring Ministry Department heads and directors of training together to analyze their common or specialized training needs, related problems, and suggestions for future training designs.

B. To provide the professional opinion of an outside body concerning the training programs and their effect.

In early 1982, a U.S. cartography specialist will come to The Gambia to run a three-week training seminar in photo interpretation with the new aerial maps of The Gambia produced under the project. This program will be designed to include all interested staff in the Ministry and on-going AID-donor projects. The workshop represents the final step in the two year process of making the project mapping activity, which involves highly specialized and refined technology, directly relevant to the Gambian officials by explaining to the widest possible audience the practical applications of the exercise. The instructor will explain the progressive stages of photo mapping and interpretation. Actual Gambian map samples will be studied by using pocket stereoscopes. The product of the workshop will be a training manual for photo interpretation similar to the one utilized by the U.S. Soil Conservation Service.

6. The Training Activities at YBK Center.

The current staffing at YBK is the followin

1 technical officer

4 junior staff: animal health

4 junior staff: animal husbandry

No senior staff is present due to insufficient quarters. The generator has been removed and the water system does not work; consequently the center has no electricity, running water, and other utilities.

The Ministry has a strong desire to rehabilitate the YBK Center as well as establish a second up-country training facility in Upper River Division at Wuli Farm. The latter idea received no support from the PP team due to the atypical soils at Wuli Farm and the insufficient or inappropriate area available for field testing and livestock-related trials. The PP team did, however, enthusiastically endorse the idea of building up YBK into a strong research and training center.

The Ministry has several ideas concerning YBK Center development and upgrading. The training is central to these ideas, for, as the Director of Farmer Training at the Department of Animal Health and Production has stated, "We adhere to the principle that people should be trained near the people they will be serving." Consequently, plans are proceeding to train Livestock Inspectors at YBK. There are also plans to enlarge the staff of the center by assignment of one or more of the Department range management specialists after they return from present training in Kenya. The PP team supports the idea of expanding the YBK facility as a research trial and demonstration center and a site for in-service staff and farmer training. The facilities will be enlarged, the quarters expanded and renovated to be able to house permanent staff and trainees for short periods of time. YBK Center will become the up-country demonstration site to which herders, ox farmers and livestock owners are brought to observe livestock husbandry programs, seed multiplication plots, grazing trials, introduction trials of grass and legumes, and other related activities. In-service refresher courses will be held for up-country staff who will be brought to YBK on a routine schedule. The long-term U.S. technicians stationed at Abuko will travel to YBK regularly to help lead these up-country seminars with YBK staff. There will also be seven Peace Corps Volunteers in YBK, the vicinity of the YBK Center, who will participate in the training sessions.

7. Training Materials.

Training materials must be procured to support the Abuko/Yundum and YBK Training Centers. Since many of these will be audio-visual aids, the natural coordinating body of such materials is the Extension Aids Unit. The Unit should receive and catalog such materials and then let them out according to priority need. The nature of training materials required will vary with the subject matter, with the level of study, and with the perceived appropriateness of the medium. For instance, the forage and maize agronomy programs will benefit from the production of a series of charts or posters, created in The Gambia, on such themes as how to plant legumes, how to keep animals off the planted grass areas, the benefits of maize growing, etc. The animal nutrition program should have at its disposal slide kits on the animal reproductive cycle, on deparasitizing livestock, etc. Packaged sets of such slides at $100 each are available in the U.S. and have been valuable assets to university training programs. After the results of the aerial mapping exercise have been made available, there will be a workshop in photo identification where appropriate training materials would be pocket stereoscopes, additional sets of aerial photos, overlays, and fine point drafting pens.

A fixed sum per project training component introduced by the various long-term technicians will be allotted, as well as an equivalent sum for training materials to be used for more general training needs.

8. Transportation.

Two 22-passenger busses, similar in type to the Renault Saviem SG 2 diesel model, will be purchased to help transport trainees and farmers to YBK, Abuko, and for field work. Furthermore, it is highly recommended that the two seven-ton Bedford TJ-6 trucks be purchased in the project for transportation of pillars, fencing materials, and the like, be fitted with a canopy and with removable benches so that they also can serve to transport passengers occasionally.

C. Cost of the Training

1. Participant Training

Fifteen person/years of participant training at an average cost of $15,000/year. $225,000

2. Local Gambian Training

Costs to be borne by the Government of The Gambia as a local cost contribution

3. Training Role for the Six U.S. Technicians

Actual costs for these technicians are included under the appropriate project component.

4. Training Role for the Thirteen Peace Corps Volunteers

Actual costs for in-country allowances for these technicians will be contributed by the Peace Corps directly. The project will supply each Peace Corps Volunteer with an appropriate motorbike at the rate of one motorbike for each two years of service:

5. Eight Training Workshops

Five workshops on communications as budgeted in the following section.

One workshop on training methodology and evaluation $ 35,000

One workshop on photo interpretation and use of aerial photography in land use management and planning is budgeted in a previous section.

6. Training Materials and Equipment

Estimated at $2,000/year per component for the five long-term activity areas:

$2,000/year x 25 project years	$ 50,000
Additional undesignated funds for general training needs.	$ 10,000

7. Transportation of Field and Training Personnel

Fifty motorbikes for field staff engaged in extension and training activities x $600.00/ motorbike.	$ 30,000
One 22-seat diesel bus Renault Saviem SG 2 or functional equivalent for transport of training personnel and trainees x $25,000/bus.	$ 25,000

V. RELATIONS BETWEEN PROJECT COMPONENTS

Similar to the next section on communications, the training element is a support function that is integrated with and contained within the concept of each project component. Each long-term U.S. technician assigned to the project will be an active trainer and will be supported in this role by the necessary materials production, construction and maintenance of a training center, and transportation for trainees. The technicians will be working as a project team. Among the technicians, as among their Peace Corps Volunteer colleagues, there will be a concerted "interface" between the technical science elements of training and the social science elements of field research in the context of the Gambian farmer, his needs, his problems, his world. The interdisciplinary focus among team workers is going to be evident in project planning meetings, in research design schemes, in curriculum development, and in devising training programs.

VI. RELATIONS OUTSIDE THE PROJECT

There is a structure within the Ministry which will be the vehicle for planning and implementation of training programs: the Training and Information Units of each Department. The Gambian heads of these Units will bear the responsibility for coordinating training inputs within their Departments. Similarly, these Units will be the official channel through which information on training will be directed outside the project. Discussion and collaboration on training policy and programs will take place with several groups.

First, the most serious thinking done recently about training for agricultural development in The Gambia has been by a working group within the World Bank-financed Rural Development Project. Ministry staff and the long-term technicians will fully inform themselves of what this working group on training has evolved as an RDP strategy and will hold discussions with this group as they are defining their own program.

Second, the Departments of Agriculture and Cooperation have additional training officers, training centers, and training programs. The Agricultural Training Officer is anxious to see develop a high-level training "task force" which would group the Ministry's training officers and establish some new policies, such as, for example, a common first year of study for agriculture and animal health and production trainees. A formal institutionalized committee for this purpose may not be necessary; nonetheless this type of discussion and recognition of the usefulness of putting heads together in problem-solving and interdepartmental planning is healthy and will be fostered and encouraged by the project.

Third, the Training and Information Units will submit ideas, plans, problems to the Ministerial planning body (i.e., the Program Planning and Management Unit). Specific training issues will be brought up whenever necessary before this body.

Fourth, the training needs and profiles of participant trainees in this project will be considered to the context of some overall training profile for The Gambia. Ministry heads of Department plus representatives of the donor countries meet regularly as the Project Coordinating Committee under the chairmanship of the Permanent Secretary. Information must flow both to and from this committee to and from the project: it will be the responsibility of the Heads of the Training and Information Units of the Ministry and the Project Chief of Party to see that this information flow on training is kept open and active.

VII. EVALUATION

The internal assessment concerning the impact and effectiveness of training materials will be forthcoming from the Extension Aids Unit when it has developed such a capability through participant training, a workshop, and the contribution of a Peace Corps Volunteer.

Basic principles of evaluation and impact measurement will also be included in the training programs of Agriculture and Livestock Assistants and Inspectors so they will be able to provide more reliable feednack from the field concerning farmer reactions and attitudes.

The enumerators trained by the socio-economic unit will record farmer reactions in the course of their relationships with extension agents and this body of information will provide valuable insights from which future training policies could benefit.

Judgments on the academic quality of work exhibited by the participant trainees in American and African universities will provide useful indications on the value of this aspect of training. When the trainees return to The Gambia and have worked a few months in their new posts they whould be assembled as a group for a one-day seminar on how their training was or was not useful and how it should be redesigned in the future.

A more formal evaluative assessment will be furnished to the project in early 1982 in a report prepared by Agricultural Sector Implementation Project. After giving its workshop on training, this consultancy will study the training aspects of the project and make recommendations.

Finally, a complete professional review of the project by an outside AID team at the third year's end will involve the participation of a specialist in training who has experience in African rural development and in program management.

COMPONENT #6 AGRICULTURAL SKILLS TRAINING AND COMMUNICATIONS

PART II: COMMUNICATIONS SUPPORT

I. INTRODUCTION

The subject of this section is the communications support system which should be put into place to enhance the chances of project success and to help the GOTG build up the capability of its extension services within the Ministry of Agriculture and Natural Resources. Development planners have become increasingly convinced of the value of traditional, printed, and electronic media used as tools for development in agriculture, health, nutrition, and family planning. USAID's Development Support Bureau has recently produced a series of 32 "project profiles" describing development projects in every continent where the media have played key support roles. The 1978 Africa-wide Education and Human Resources seminar that USAID held in Abidjan, Ivory Coast, adopted the resolution that communications support should form an integral part of every development project.

In The Gambia, there are several institutions in the public sector which already play a communications support role for rural development. Chiefly, there is the Ministry of Information, which has created a film unit and has set up Radio Gambia. Within the Ministry of Agriculture and Natural Resources, there is a common service available to the five Departments which is entitled the "Extension Aids Unit". Its mandate is to conceive, produce, distribute, and evaluate audio-visual materials relevant to the training and extension programs of these Departments. Each of the Departments has a staff person at its headquarters representing it on a committee to plan and allocate resources within the Extension Aids Unit. These persons are also the liaison agents with Radio Gambia. Some regularly utilize audio-visual equipment (i.e., reel tape recorders) during field missions and try to encourage media use in their department.

The Film Unit is directed by Ebrima Sagnia, who received training from a UNESCO scholarship and expatriate collaboration. He constitutes a one-man production team. As staff, he has two assistants who have recently returned from training by the Ghana Film Industry Corporation and who operate the black and white film processing laboratory which is housed in Radio Gambia. Since 1967, the unit has produced on the average two short documentary films a year. Most recent films have been produced in color, which involves sending the film for processing and sound mixing to Sweden or the UK. The Unit's annual budget is $1,635 for film production and, since it has a processing lab, another $1,870 has been put at its disposal annually for lab operations. The three most recent films produced were on "Radio Gambia," "Independence Day," and "The 1978 CILSS Conference in Banjul Grouping Eight Heads of State." To date, four films have been produced on agricultural subjects. These are circulated to rural areas by the Ministry's mobile cinema vans.

Radio Gambia broadcasts over medium wave every day for 11-1/2 hours each weekday, 14-1/2 hours on Saturday, and 16 hours on Sunday. The transmitting station near the capital at Bonto is of 20 KW strength; a second transmitter in Basse 200 miles to the east is of 2 KW. Reception is said to be excellent throughout the country except for the eastern district. Several programs are broadcast in the local languages, Mandinka and Wollof, but the majority are in English. For 1979, the Emirate of Qatar has committed $500,000 to build a second 20 KW transmitter and thus create what has been announced as a second channel for educational radio. The educational radio programs will be divided into two categories: schools broadcasting and rural and farm broadcasting. School broadcasting has already begun on a pilot level with English and social studies lessons 15 minutes a day to first graders. Gradually local language instruction is to be introduced.

The rural and farm broadcasting currently consists of one 30-minute program per week each prepared by the Departments of Agriculture, Cooperation, and Animal Health and Production. For the last Department, this programming typically consists of only ten minutes of new material because the scripts are read in Mandinka and Wollof plus the language of most of the herders, Foula. In 1978, two weekly 30-minute round table discussions were added to these Departmental programs which bring together three representatives of the different Departments with occasional farmer guests. This new programming was designed by the recently appointed Director of Rural and Farm Broadcasting, Bemba Tamdebou, to coordinate Ministry of Agriculture interventions or, at least, to initiate an integrative method for trying to solve some of the farmers' and herders' problems.

There has been one experiment in organized radio listening of the "Radio Club" type. In 1972, the Freedom from Hunger Campaign offered a radio receiver to one Gambian village. A local leader, wealthy planter and livestock owner volunteered to be discussion leaders. The club existed for four years before disbanding. According to the radio staff, however, the club was a perfunctory meeting of the elite and fulfilled no worthwhile educational or informational purpose. There is interest at Radio Gambia in reactivating an improved concept of the radio club. Radio Gambia's staff maintain that they have no time presently for audience research concerning the extent of its listenership or the popularity and impact of its programs.

The Extension Aids Unit was created to support extension activities in the agriculture sector alone, not animal health and production or cooperatives. The present director, his counterpart, and an assistant currently undergoing film-making training in Kenya are all from the Department of Agriculture.

Supported by USAID and the IBRD/RDP, the Extension Aids Unit beginning in 1978 was officially invested with the responsibility to serve equally all five Departments within the Ministry requesting its aid. The services of the Unit have been in the following areas: circulating films for rural viewing in USAID-financed mobile cinema vans; printing extension brochures on planting vegetables, fruit trees, etc.; publishing a Gambian Field Workers' Magazine - "Senela" - every three months (average length 20 pages); printing literacy materials in local languages; and revising crop extension bulletins. The Unit possesses an offset lithograph machine, a process camera printing frame, poster equipment, 35 mm camera, Super 8 camera, dark room equipment, film and slide projectors, etc. This equipment was given to the Ministry of Agriculture and Natural Resources by USAID through its Sahelian Relief and Rehabilitation Fund. The eighteen room building housing the Unit facilities was a grant from the IBRD Rural Development Project.

USAID also gave the Unit a fleet of five Land Rover cinema vans which have been used constantly since 1976. The vans, each manned with a driver/operator, leave Banjul on the first day of each month and return after 25 days of consecutive evening showings in villages along five predetermined itineraries. The fourth week is devoted to driver rest and equipment/vehicle maintenance. The films shown in villages are selected from the Ministry of Information's Film Unit stock and essentially entail three films on agricultural subjects ("Seed Next Year," "Vegetables for Health," and "Training Better Farmers") and one film on livestock ("Market Your Cattle"). Experiments with showing a film on soccer or films made in the UK and US have proven to have relatively low popularity compared to films made in The Gambia or on issues and practices of local interest. After the driver or a local villager has translated the film dialogue as necessary from Mandinka to Wollof, Wollof to Mandinka, or into Foula, discussions are led by local extension agents. The driver/operator also serves as collector of feedback. He brings back sheets with principal questions or comments collected after each rural showing. Subsequent radio programs address the questions asked. The monthly spectator total is reported as being about 35,000.

To conclude this introduction on the communications situation in The Gambia relative to media support for agricultural and livestock extension programs, a final resource should be mentioned: the trained staffman in a technical specialty, such as livestock, who by his training or his individual interest serves as a communicator. All design team members in studying the Department of Animal Health and Production's willingness to work diligently and patiently with the Livestock Owners' Associations and with individual farmer problems have been impressed by the Department's Director of Farmer

Training. Mr. Dembo Bojang's personal initiative has resulted in an outstanding and regular use of tape recording at Livestock Owners' Association meetings. As the Department's liaison representative to Radio Gambia, Mr. Bojang decided not to produce his radio programs from Headquarters exclusively. Most of his recorded time emanates from field trips where, during a Livestock Owners' Association meeting, he will ask each spokesman to speak into his microphone, thus enabling farmer questions, complaints, requests for better services, and the like to be brought up publicly and later broadcast all over the country. Recently, in an effort to bring traditional media to bear on his Department's extension efforts, he has solicited the services of a griot or praise singer who is accompanied by two local instruments, the cora and the balafon.. The Association meetings in the field often begin by a concert, after which with traditional soft music continuing in the background the griot will serve as interpreter from one local language to another, or will paraphrase statements forming an integral team with the livestock spokesman as they together exhort the farmers who at the same time are pleasantly treated to the familiar cadences out of their own musical tradition.

II. GOAL OF COMMUNICATIONS SUPPORT

To increase the economic well-being of the Gambian farmer.

III. PURPOSES

1. To provide information on a regular basis to Gambian farmers concerning improved farming techniques.

2. To demonstrate to farmers that the Government is anxious to share information with them and encourage them to improve their lot.

3. To promote a sense of commonality of rural problems and cooperation in searching for solutions.

4. To build up the Government's capacity to provide effective extension services to farmers by contributing substantially to available trained cadres for producing graphic and audio-visual materials suitable for extension and training uses.

5. To allow farmers to play an active role in group activities and extension meetings after which they are rewarded by seeing themselves or hearing themselves through recordings.

IV. OUTPUTS

A. Training Results

1. One trained Director of the communications support system - i.e., "Extension Aids Unit" of the Ministry by 1981.

2. One trained graphist who becomes a productive member of the Extension Aids Unit staff by 1981.

3. One trained evaluator of communications and extension services to take over the communications evaluation and feedback program at the Unit by 1982.

4. One trained filmmaker/media specialist to be on the Unit staff by 1982.

5. Fifty senior and junior staff from the Extension Aids Unit, the Film Unit, Radio Gambia, and the liaison representatives of the five Departments of the Ministry will have been initiated into several new concepts and strategies of communications support through the series of five workshops and will be applying the results in their own daily work by 1982.

6. Extension Aids Unit staff and their collaborators will benefit from the expertise in graphics and evaluation methodology which two Peace Corps Volunteers will have brought to the Unit during the time when counterpart training abroad in these fields is taking place, i.e., 1980-1982.

7. One Director of Farmer Training with acquired on-the-job skills in videotape operations.

B. Media-related Results

1. 5000 Livestock Owners' Association members will have direct access to radio listening, including programs in local languages on agricultural and livestock development.

2. 200 hours of audio-taped farmer discussions, questions and answers recorded.

3. 50 hours of video-taped materials on farm demonstrations, backyard fattening schemes, chicken raising, etc., which 5000 farmers will have viewed over playback monitors in their villages during visits from the Department of Animal Health and Production specialists.

4. 175,000 spectators annually in villages who will have seen several films on agricultural and livestock production through operations of the fleet of circulating cinema vans.

5. Five local films on animal health and production subjects will have been produced and 5 others borrowed or copied.

6. Greater visibility for The Gambia and the Departmental extension services by circulating copies of local films to other Sahelian countries and African media institutions.

7. Graphic materials for extension and training uses produced under the direction of a Peace Corps Volunteer using already available equipment and materials.

C. A General Result

1. Increased collaboration between central media (i.e., film, radio, extension facilities) and Ministry's Departments in carrying out extension and outreach programs in rural Gambia.

V. INPUTS

A. Government of The Gambia Inputs

1. Cyril Eyre, Director of the Extension Aids Unit, is extremely grateful for the assistance USAID has provided and will continue to provide in support of the Unit. He has vowed to increase his aid to the extension and taining efforts of the Department of Animal Health and Production and other Departments of the Ministry as needed and appropriate (no cost).

2. Baboucar Manneh, Assistant Director of the Extension Aids Unit, has already taken a year-long course in Communications at the University of London after having earned a certificate in agricultural science. He will be trained in the U.S. in a one year Bachelor's level program prior to assuming the directorship of the unit. (Budgeted in training section.)

3. Bemba Tambedou, Director of the Rural and Farm Broadcasting Unit of Radio Gambia (Ministry of Information) has pledged his assistance to improve both the quality and quantity of air time devoted to the Animal Health and Production Department. (No cost.)

4. Ebrima Sagnia, Director of the Film Unit (Ministry of Information), has promised his collaboration, particularly the processing laboratory, in helping all Departments of the Ministry produce several additional films for dissemination in the mobile vans. (No cost.)

5. Dembo Bojang, Director of Farmer Training in the Department of Animal Health and Production, will continue in his role of official liaison from the Department to the Extension Aids Unit and Radio Gambia as well as continuing his tape recording sessions with Livestock Owners' Associations throughout the country. (No cost.)

6. Baboucar Saine, Veterinarian, recently transferred to the Extension Aids Unit to pursue his interest in graphic art work, will receive training in an African university and represent the Department of Animal Health and Production on the Extension Aids Unit staff. (Budgeted in Training Section.)

7. A hitherto unidentified Gambian will receive 1-year training in the U.S. in the field of evaluation of communications systems and extension services 1980-82. (Budgeted in Training Section.)

8. Pierre Shyngle, present Director of Training at the Department of Animal Health and Production headquarters, who has taken a course in the United Kingdom in audio-visual techniques for the classroom, will personally supervise the Extension Aids Unit contribution to staff training at the Abuko and YBK Training Centers.

B. Non-Gambian Government Inputs

1. A graphics specialist/Peace Corps Volunteer to work for four years, July 1980-84, in the Extension Aids Unit with the production of media support materials for the extension services (to be budgeted by Peace Corps).

2. An extension program evaluator/Peace Corps Volunteer to help create a feedback and evaluation system to monitor the impact of agricultural/livestock extension services and improve the effectiveness of the Extension Aids Unit for 4 years: July 1979-83 (to be budgeted by Peace Corps).

3. Consultants to run workshop in December 1978 on extension evaluation techniques and use of rural radio to support development projects: of two-week duration, estimated 10 person/weeks to be covered by AID/Washington Development Support Bureau (no cost to project).

C. Equipment and Commodities (quantity, item, date, cost)

1.	One mobile cinema van plus parts	1981	$25,000
2.	One portable video-tape set (camera, microphone, tape-recorder, playback, monitor) plus parts (3/4" color)	1981	7,000
3.	Fifty hours of video cassettes, 3/4" color	1981	2,500
4.	One 16 mm movie camera and sound equipment	1980	1,500
5.	Fifty transistor radios	1980	4,000
6.	Two reel-to-reel tape recorders	1980	500
7.	Audio tape reels (5 in.)	1980	300
8.	Production and processing of 5 15 minute 16 mm films in black and white	1980 1980 1981 1982 1983	1,000 1,100 1,200 1,300 1,400
9.	Production of sound negative films with 4 copies of each film	1980 1980 1981 1982 1983	850 950 1,050 1,150 1,250
10.	Ten additional films to be purchased	1980	6,000

D. Commentary on Equipment and Commodities List

1. Since 1976, the mobile cinema van has proved a highly workable and active program component in Ministry extension activities (see Introduction). In the past, however, the routings have favored Department of Agriculture field stations to the detriment of other Departments within the Ministry. It is with this shortcoming in mind that two independent AID planning teams are each proposing an additional van to be given to the Extension Aids Unit (which is mainly staffed by agriculture officers) but earmarked for the Department of Cooperation on one hand (under an operational program grant proposal) and for the Department of Animal Health and Production on the other. In this fashion, these Departments will have one van at their disposal at any time they may need it. This special earmarking condition under the project has been agreed upon in a joint meeting of Extension Aids Unit and Department of Animal Health and Production staff members.

   Included in the budgeted figure is the usual spare parts package, plus funds for additional screens and tires, the two commodities which since 1976 have shown to require replacement and which are not normally covered in the package. The vans and parts are available from British Films Limited and from Land Rover (BFL has specialized in the fabrication of mobile cinema units since 1930).

2. SONY portable VTR equipment has been used in The Gambia since early 1976, exclusively in connection with a UNDP/UNESCO "Hardware Project" carried out in the Ministry of Health. The experiment, which is being run concurrently in Egypt, Iran, the Philippines, and Costa Rica, has terminated and a UNESCO evaluation has concluded that The Gambia results were more successful than those in the other countries. The Ministry of Agriculture and Natural Resources has not been able to benefit from the equipment which was used exclusively for human health-related subjects. The Ministry would like to add the visual component to its audio recording capacity on an experimental basis. The three-qparter inch color cassette VTR system would allow the Ministry Departments to field test the use of this recent technology during its extension visits - e.g., to Livestock Owners' Associations or maize demonstration plots.

As is the previous case, the VTR equipment would be given to the Extension Aids Unit, which would be responsible for maintenance and repair, but earmarked for the project activities on a priority basis.

3. The collection of 15, 20 and 30 minute videocassettes would be for the exclusive use of the Departments involved in project activities.

4. In November 1978, the Extension Aids Unit will add a film-maker, who is currently being trained in Kenya, to the staff. The Unit has such a film production demand from the five Departments it serves that reliance upon the Information Ministry's Film Unit alone has proved insufficient. The Film Unit has admitted difficulty in serving all requests in a timely manner and has stated its approval of a second production capability. The Extension Aids Unit will not be establishing a film unit itself. It will, however, develop a capacity for making films on agricultural subjects. It is planned that all film editing and processing will continue to be done with the Film Unit's equipment.

5. In the past, the donation of transistor radios to rural dwellers has existed on a small scale. The Extension Aids Unit distributed 25 radios - one to each of the Mixed Farming Centers in its agricultural program. It is proposed that the 42 Livestock Owners' Associations be given a radio each, and the remainder for YBK - the up-country research and training center of the Department of Animal Health and Production. In this fashion, Association members will have greater access to local language radio programs on animal husbandry, including recorded sessions of Livestock Owners' Association meetings, which will have particular pertinence to them. It is also planned in collaboration with Radio Gambia that the Association radio sets will form the basis for an experiment with organized "Radio Clubs".

6. In the past the Department of Animal Health and Production has borrowed a Euer 4000 reel-to-reel tape recorder for up-country travel and interviewing livestock owners and herders. The material collected was then edited and broadcast over the radio. The two recorders budgeted would assure the continuation of this practice. Again the recorders would belong to the Extension Aids Unit, but earmarked for priority use by the project.

7. The five inch reel-to-reel tapes (900 feet LP 13) would be for the exclusive use of the project.

8. The mobile cinema van constitutes a viable means of circulating films throughout the country and reaching large numbers of farmers. Unfortunately for the first year and a half during which the mobile vans have circulated only the four original agricultural and livestock films have been shown and reshown. Hence there is a pressing need to produce and purchase additional films on relevant subjects.

   It is planned that the Departments, the Extension Aids Unit, and the Film Unit will collaborate to produce one film a year from 1979 to 1983. The procedure for collaboration with the Film Unit has precedent. The requesting Department officially writes the Director of the Film Unit specifying the nature of the film it would like to have co-produced. The Film Unit responds with an estimate of funding or other contribution it needs to complete the task. Normally, the contribution is the value of the raw film stock (currently $1 for 12 feet of color film and $1 for 20 feet of black and white film) and the cost of processing if this is to be done out of country (approximately $1600 for a 20 minute color film). Processing in black and white is now done in country and without charge by the Film Unit. Only black and white film is being recommended here, thus permitting local processing and lower costs.

9. One unfortunate fact that is apparent in many developing countries and in which the Sahelian nations are no exception is the absence of exchange of films and other audio-visual products across national borders. The field of livestock is an especially poignant example of this, for most Sahelian nations have produced one or more films on raising livestock, including local language dialogue which is invariably Foula - thus the films could be understood by herders across borders.

   There are at least two vehicles for encouraging inter-country exchange of films. One is the financial means and the other is the institutional facility. Concerning the latter, the Union des Radiodiffisions et Televisions Nationales Afrique (URTNA) based in Dakar to which 34 African countries belong,

includes in its mandate the exchange of media products among member countries. Its budget has not permitted it to be active in this domain. A second repository through which films could be viewed by developing country officials visiting Washington, D.C. or sent out to any post frequently is the "Clearinghouse for Development Communication," or AID/Washington's educational technology collection of print and non-print materials.

Concerning the more crucial financial responsibility, there are a variety of ways. One way which was suggested at the Africa-wide AID Education and Human Resources seminar, held in Ivory Coast in 1978, is for individual project budgets to include under their communications component the funds for the reproduction of relevant products, as is done in this project.

Specifically in this case, it is agreed that the four copies of locally produced films from The Gambia be disposed of in the following manner: one given to URTNA; one to the Clearinghouse for Development Communication; one used for mobile van showings, and one held in The Gambia for reserve. Hopefully in this way not only will The Gambia obtain international visibility but thousands of film spectators in neighboring countries will also be able to benefit from the resources which were invested in national film production.

A final technical detail. The Film Unit in Banjul cannot make the sound negative necessary to produce the copies. Consequently, this task must be performed abroad.

10. Before any effective film exchange program becomes operational, Gambian farmers would be attending mobile film showings for years with very little variety in the films. Aware of this reality, the Extension Aids Unit sent a livestock official in a team to Dakar to view films produced by the Société de Développement Agricole (SODEVA). Several were judged to be applicable, and the common language - i.e., Wollof - was an obvious advantage. This budgetary item will allow purchase of several films to be added to The Gambia's permanent film collection and circulated in the vans.

In addition, attempts will be made to borrow relevant films from other sources. In this context, the International Communications Institute has recently ordered a film on range management for a long-term loan to the Government.

E. Total Cost Input Section

Equipment and commodities	$58,050

VI. RELATIONS BETWEEN PROJECT COMPONENTS

The communications support component has a natural tie with other project components - i.e., technical inputs in forage agronomy, animal nutrition, the farm cart program and range management - because it is being designed to spread knowledge about such new programs. For instance, the series of five films to be produced will all highlight key aspects of the "new" technologies developed and tested in The Gambia. Although final choices have not been made, preliminary discussions have included the following suggestions for film subjects: backyard fattening schemes; the improved farm cart package; the functions of a Livestock Owners' Association; the maize program; and range management.

VII. RELATIONS OUTSIDE THE PROJECT

The fact that most of the inputs from the communications component - personnel, workshops, equipment, commodities - are funnelled through the Extension Aids Unit, itself a common service to five Departments within the Ministry of Agriculture and Natural Resources, is important in assuring a sharing of resources and an information flow on a horizontal level. In addition to this build-in collaboration, two institutions within the Ministry of Information - The Film Unit and Radio Gambia - will also be brought into the process of production, processing, and diffusion of media products designed to support sector development. Similarly on a vertical plane, the mobile cinema van circuit as well as the field visits and recordings of Livestock Owners' Associations will provide regular contact between central authority and farm-level groups.

VIII. EVALUATION

Evaluation or assessment of the communications support system will be performed within the system itself, by collaborators, and by outsiders. Through project inputs the Extension Aids Unit will develop its own self-evaluation capability involving a feedback system to obtain information from cooperating Departments and Offices and from farmers/listeners/spectators in order to become a more effective service The evaluation component will be overseen by the socio-economic unit of the project so as to assure professional and non-biased supervision. The three essential inputs constituting this internal feedback mechanism are the preliminary workshop on communications support and extension program evaluation; the presence of a Peace Corps Volunteer in the Extension Aids Unit in the role of program evaluator, and the participant trainee in communication evaluation methodology. From these three personnel inputs, a user-based feedback system should develop permitting periodic or short-term adjustments and program improvements.

When workshop consultants participate in staff training on an annual basis they will be asked to submit their own evaluations of the work their trainees have performed and their perceptions concerning the organizations and functioning of the EAU and related services.

A regular outside evaluation will be performed on the overall project by an AID/Washington selected team after the third year of operation. On the multi-disciplinary evaluation team should be a specialist in training and communications who has experience in African rural development and in program management.

ANNEX K.

SOCIAL SOUNDNESS ANALYSIS OF PROJECT COMPONENTS

ANNEX K: GAMBIA MIXED FARMING AND RESOURCE MANAGEMENT PROJECT: SOCIAL SOUNDNESS ANALYSIS

The Gambia Mixed Farming and Resource Management Project will engage in a broad array of activities designed to improve the productivity of the individual farm unit and to raise incomes and standards of living in the rural areas. The project will operate country-wide; therefore, this social analysis begins by presenting a general description of the social background of the country. It examines the socio-cultural "landscape" within which project activities will occur and analyzes both the government's capability for and the village context of development activities. The feasibility of specific activities of the project is then discussed together with the potential for spread effects through low cost replication of project interventions. Finally, the impact of the project is forecast; specific groups of beneficiaries are identified and the degree of equitability of expected impacts is assessed. The project as designed offers the exciting possibility to generate positive results in growth terms while attending carefully to equity concerns in the Gambian village setting.

I. The Gambia: Social Background

The social and political background of village life in The Gambia is especially important to narrate because of the unusual receptivity to change that has grown up in the rural areas of the country.

Surrounded on three sides by Senegal, the existence of The Gambia as a separate political entity is a function of its geography. Since the Gambia River is one of the few waterways in Africa navigable by ocean-going vessels, European powers struggled for control of the trade that flowed from its banks. Portuguese, French, and Dutch possession eventually gave way to British, who ruled from the early 1800's to Gambian independence in 1965.

The river trade encouraged the centralization of political powers along the banks. A dozen kingdoms established their influence along segments of each river bank, with hinterlands extending into what is now Senegal. Eventually, under colonialism in the twentieth century, the kingships went into decline as the external authorities dealt directly with each major village on its own. The old kingdom names persist in the names of present-day administrative Districts, but often their domains have been broken into two or more Districts. Each of these Districts has a chief called a seyfo who represents and coordinates activities among villages in the District but has only limited formal authority from the central government.

The country as a whole is divided administratively into Banjul and five Divisions, each under a Commissioner appointed through the Ministry of Local Government. There are thirty-five Districts, each with a seyfo chosen by village heads from eligible candidates. The seyfo and village heads constitute a District Council. Each District also elects a Member of Parliament, so that the District has its own political channel to the central government independent of the system of Divisional Commissioners.

The population of the country is now about 550,000 people. About 15% of this population is in the Banjul urban area at the River's mouth. The rest is in the five rural Divisions: Western Lower River, North Bank, MacCarthy Island and Upper River.

Twenty-one ethnic groups were recorded in the 1973 census, but five of these account for 95 per cent of the population and one - i.e., the Mandinka - for 42.3 per cent (see Table 1). There are concentrations of Wolof and Serere in Banjul and in the north central areas, Jola in the southwest, and Fula in the east of the country. Everywhere there is considerable intermixing of villages and most Gambians grow up speaking at least two local languages. The Mandinka predominate in every Division. Along most of the river, the typical settlement pattern is one of a larger Mandinka village every couple of miles, with smaller settlements of Fula, Jola, or some other ethnic group clustered around it.

The population is young. It would be younger still except for a mortality rate of nearly 30 per cent among children under the age of two years. Forty-two per cent of the population is under 15 years old. Life expectancy at birth is under 35 years, but the child who reaches five can expect to live fifty years more.

Overall population density is about 75 persons per square kilometer, which is high for the Sahelian countries and reflective of The Gambia's higher rainfall and more intensive agriculture.

Table 1: Ethnic Groups in The Gambia

Ethnic Group	% of Population
Mandinka	42.3
Fula	18.2
Wolof	15.7
Jola	9.5
Serahuli	8.7
Serere	2.1
Manjago	1.3
Aku	1.0
Bambara	0.4
Other	0.8

Source: Dunsmore, et. al., p. 248

II. The Socio-Cultural "Landscape"

Any rural development project working across a whole country in West Africa must articulate itself into two different "landscapes". Obviously, the village is the vital setting. Without a profound understanding of village social processes and trends, there can be no firm expectation that any particular intervention will succeed. Points of contact between the new activity and the established order of things will be haphazard and often at cross-purposes. As well as the village setting, the "culture" of the bureaucratic institution which the project will be supporting must be understood. Without assurance that the institutional spirit and will exist to pursue the project goals, the project is sure to founder or move forward only so long as it has its own "motor" in the form of an expatriate team. Both settings are described here so that the feasibility of project interventions can be adequately assessed on both counts.

A. The Institutional Setting:

Appendix G. outlines the agricultural sector of The Gambia's economy. Agriculture accounts for over 95 percent of country exports, 85 percent of employment, and 90 percent of the average Gambian's income. The Sahelian drought of 1972-1974 brought home to the Government the inadequacy of a single-crop, export-oriented economy. The GOTG therefore revised its rural commitments to pledge food self-sufficiency by 1980. It wrote a new Five Year Development Plan for 1975-1980 which emphasized agricultural development in food, crops, crop diversification, and redress of the existing imbalance of rural-urban expenditures and incomes.

The Rural Development Project (RDP), jointly financed by the World Bank, the British Government, and the Arab Bank for African Development, is the centerpiece of this commitment on the side of food and cash cropping. With a technical package developed earlier and modified through careful field evaluation, this project is moving thousands of sets of equipment and tools into over sixty villages. So many farmers have responded to this initiative that third year targets for the project have been achieved in the first full year of field operations. The GOTG is currently planning for a second phase for the project which will cover the whole country. This planning is providing a major opportunity for review of the entire agricultural situation. Working groups on every aspect of the project, composed of representatives of every relevant branch of government, are meeting to ensure maximum input into what is seen as the major crop development project of the 1980's.

The commitment of the GOTG and its Department of Agriculture are thus clear in the crop sector. For other aspects of agricultural development, the GOTG has been looking to the United States for assistance. USAID's Crop Protection and Soil and Water Conservation Projects provide general support to the sector. A proposed activity in forestry will enhance local capability in this field.

The present project relates to all these projects by focussing on the problems of managing fallow lands and grazing areas for maximum sustained yield output. It will add incremental income to the budgets of rural people by turning crop residues, fallow fields, lands unsuitable for cropping, and other resources now largely unmanaged into productive enterprises of the family farming operation. In an economy in which animal protein is now consumed only a few times per month and cash incomes are only about $100 per year per capita, bringing these available resources into more effective use can have a significant effect upon rural health and welfare.

The project will work primarily through the Ministry of Agriculture and Natural Resource's Department of Animal Health and Production (AHPD). This Department, like its counterpart, the Department of Agriculture, has been gearing up for a major effort to increase rural production. Moving from an earlier history of providing only veterinary services, mainly to cattle, the AHPD has undertaken major initiatives to better serve the livestock sector. It has changed its name to better reflect the production focus. It has enlarged or rebuilt its clinics and offices throughout the country. It has sent more than two dozen trainees abroad for upper level technical training, only six of whom are being trained in animal health with the rest in such fields as range management, animal nutrition, and animal husbandry. The AHPD has engendered lively interest all over the country through a weekly half-hour radio program which features comments and questions recorded among farmer groups in the countryside as well as one of the country's leading musicians. It has succeeded in gaining a bigger share of the time of the AID-donated mobile extension aids vans which tour the rural areas. It has reorganized The Gambia Livestock Marketing Board and provided it with infrastructure and capital to facilitate upcountry marketing operations. It has improved its livestock census capacity, taken initial steps to demarcate cattle trails, carried out the first vaccinations of small ruminants, and begun preliminary trials of forage crops. Most importantly, it has encouraged the creation of Livestock Owners' Associations (LOA's) in every district in the country, with a total present membership of over four thousand farmers and enthusiastic willingness to improve the livestock sector. In short, like the Department of Agriculture before the Rural Development Project was funded, it is poised to reach out into the countryside at many levels with proven services and pilot programs designed to have a major impact on the livestock

owners of the country. The present project gives structure, focus and mobility as well as financial support to these efforts, and ensures the close integration of the AHPD's efforts into those of the other Departments of the Ministry.

B. The Village Setting:

The ease of trade along the Gambia River that made control of the territory a colonial prize also brought strong pressures for change to the peoples along the banks. The growing industrialization of Europe required oil for machinery, with vegetable and animal oils being in strong demand. By the 1830's, the European traders of Senegal and The Gambia were actively encouraging the expansion of groundnut planting, which local populations found easy to substitute for an indigenous legume (the "Bambara groundnut") already in their cropping system.

By 1900, the British were administering The Gambia directly, and the older kingships had gone into decline. Each major village became a producing unit with its own outlet, at the river bank, to world trade. It was not until the middle 1950's, for example, that the villages of the south bank of the Gambia River were connected by more than a rutted dry season dirt-track. Each village had virtually independent relationships with the colonial power and the world market. To sustain this relation, the authorities of the village wielded a strong hand over village life. This leadership consisted of a form of steering committee with core elders led by an alkali, the village chief, whose public declaration of a decision after village deliberations was virtually unchallengeable. The durability of these arrangements is striking: A British trader wrote in the mid-1700's that "if a Person wants any Thing to be done....the best way is to apply to the Alcalde... if (he) does not take care to keep in with the Alcalde he will seldom or never get Things done as they ought to be" (cited in Quinn 1968:446). In 1977, the social analyst on the USAID Soil and Water Management Project carefully warned that "no one can expect to accomplish anything important that requires the cooperation of a traditional village unless he goes through the Alkali and the village elders."

The village, thus dependent on its external trade, was organized internally to meet its needs. A firm, if not elaborate, caste structure determined access to various roles within it. The "founder/settler" families of freeborn Mandinka were in control, aided by such of the second group - also freeborn but later settled immigrants - as might secure places of power on the basis of wealth or knowledge. Individual families in the third caste grouping, the artisan castes, including leather workers, smiths, weavers, musicians, and potters were attached to freeborn families by the exchange of services and supplementary foodstuffs.

Slaves, the last caste, were not usually numerous but added some labor power in their owners' fields. Each village normally had members of all four castes, and many had satellite or sub-villages of other ethnic groups or Mandinka immigrants nearby.

Gambian villages are thus large, compact settlements of from two to three hundred to several thousand people. They are generally situated from one to five miles apart in a country-long band along each river bank. Each major village controls a cross-section of the soils in its areas - i.e., river frontage, swamps and bottomlands, and the colluvial soils which bear the great part of the groundnut crop. Finally, the uplands are variably farmed, used for grazing, or left as scrub brush or forest.

Cutting across the caste structure was the organization of lineages and compounds. Each of the major lineages (groups of kinsmen) in the village lived in a "kabilo" or ward, in one or several sets of houses or "compounds". Lineages often extended across villages, but they acted together infrequently, and the founders of the kabilo in any of the village controlled their own portion of village lands as the original claimants. They might allocate parts of their lands to recent immigrants, slaves, or families. Fula families settled outside the village in hamlets of their own where they herded their own and the kabilo's cattle. Muslim scholars whose presence would honor their family were supported and settled in the village. At each subdivision of family land, whether among village newcomers or subsections of the family as it grew and divided into further compounds, control of the land passed for all usual purposes to the new unit. Theoretically the king, the village chief of the founders "owned" all the land. In fact, each new resident unit producing on the land kept it for as long as that unit survived. It might also acquire more land if it grew. Since most types of land were in adequate supply, strict definitions of alienable ownership did not arise. The trend over time has been toward smaller and smaller units controlling their own land and making their own production decisions. Typically the head of each compound allocates land at the beginning of each agricultural season to the members of his compound and mediates their desires for various types of fields and crops. Large compounds (compounds range from two to over one hundred people) are usually subdivided into "dabadas". These production units, each with its own head, are composed of close kinsmen and may be seen as potentially separate compounds if the internal fission becomes complete.

Compounds, or the dabadas within them, were and are the units of production. Primarily with family labor and hand tools, members cultivated the lands available to them. Founder compounds kept the best lands for themselves. To take best advantage of soil types and micro climatic variations, fields were scattered in small parcels from within the confines of the compound

to distances of up to seven kilometers. Many of those fields were collectively cultivated by the compound or dabada, with the production put into the communal stores under the control of the compound head. For two days a week, however, individuals might cultivate "kaminyango" fields - i.e., fields for their own private gain. The kaminyango offered individuals the chance to build their savings, pursue their own career strategies or provide additional items for the trading season after the harvest. A nuclear household with older children might earn additional income for new clothes; a woman might insure against her children being neglected by a husband with more favored wives; and a craftsman might earn enough for the tools to pursue his trade independently.

Other forms of labor were also available. During the growing season when food stocks from the previous harvest were depleted there was an annual "hungry season". Most people lost weight during this time, but those compounds with sufficient food stocks could call together a "kafo", a group of rough age-mates, and, for the price of feeding them during the period, obtain supplementary farm labor services. Since the free-born families had the best lands and thus presumably the highest yields and were the leaders of the kafos, they could afford more kafo labor than poorer families with no surplus food. Slaves usually lived in their master's compound and augmented the labor force on the collective fields. Finally, a compound might receive one or more "strange farmers", who were young or dispossessed men seeking to maximize personal control of their earnings by migrating for one or a few seasons to a distant village. Again in this case, the freeborn families were more likely than others to have the land to loan them.

With differential access to land and labor, differences of capital accumulation (and of health status) became evident. The ability to avoid the hungry season was one mark of being well off. Well-kept houses with changes of thatch to eliminate insect infestation, changes of clothing, the ability to support a Muslim teacher and thus gain religious merit, and the possession of sufficient cash reserves to be a trader or a money lender were additional indicators of prosperity. Larger compounds tended to be wealthier than small ones and there apparently were real economic returns to efficient management of available labor on these larger farms.

Surpluses were also stored. Jewelry provided a way for women to keep their savings. The enormous flanged gold earrings seen especially in the east of the country are impressive savings accounts! More important were investments in livestock. All compounds, or rather individuals within them, kept poultry, sheep and goats. As with the personal kaminyango fields, the ownership of small stock provided personal cash returns or an available resource when a feast, ceremony, funeral, illness, or a birth dictated his or her personal participation.

Cattle were the savings deposits of the wealthy compounds. The compound head would invest communal surpluses in cattle. Individuals might share ownership of a cow, or own one or more outright. If the compound herd, made up of various owners' cattle, were large, it might be herded as a unit or split into two or more herds. In any event, cattle were rarely herded by compound members (except in Fula families). Rather, a Fula herdsman living in the compound for the purpose, or living in his own nearby settlement, would take care of his own animals as well as the compound herd. Only about 20 percent of the compounds actually maintained any of the cattle herds although actual ownership of animals may have been diffuse. Among herds maintained, only a small proportion of the total numbered more than 75 animals and most contained 50 animals or less.

Patterns of social organization, production and resource control have been described herein in the past tense because many changes have occurred in them in the recent past. Although there was never a long period of stability in The Gambia, the system discussed above grew up in relation to the world economy and not as a remote "traditional" culture. The growth of trade increased the monetization of the economy and fostered commercial attitudes in the farming community. After World War II, there was a new mobility among ex-soldiers and people who had worked in the wartime economy of Banjul. Old social distinctions began to break down as new "money" led to village influence and diversity.

The return from devoting time to personal endeavors at the expense of contributing to the extended family grew more apparent to individuals. The tendency since then has been for compounds to split into smaller, more nuclear groups at an increasing rate. Kafo labor is less available now. The collective labor necessary to clear new fields in the land left to long-term fallow is brought together only infrequently. Men's labor is increasingly devoted mainly to the groundnut fields, where foodgrains are interplanted in a variety of rotations. Women's labor has increasingly been allocated to rice production in the swamps. A strong sexual division of labor has thus grown up both in individual farm tasks and in the overall responsibility for different crops; therefore, innovation must take cognizance of the existence of separate labor schedules for men and women.

From 1955, animal traction techniques with oxen as the power source were introduced in government-sponsored programs and the technology gradually spread to many of the wealthier compounds in the country. To a somewhat lesser extent, the poorer compounds that could at least afford to rent a neighbor's ox team for ploughing also benefited from this program.

In short, there has been a slowly rising standard of living in the rural areas that has been largely tied to fluctuations in the groundnut trade. The adaptiveness of the Gambian farmer to new agricultural conditions has been evident since the establishment of the current commercialized economy early in the last century. Men have adopted new technologies and increased their concentration on groundnuts in response to the upward movement of groundnut prices and to the deliberately favored credit and marketing arrangements for the crop. Women have intensified production of both swamp and rainfed rice. The traditional grains, millet and sorghum, are disappearing as staples in favor of rice. Increasing cash incomes have diminished the effects of the hungry season, allowed at least some families to purchase metal roofing for their houses, permitted the acquisition of more consumer goods like beds and flashlights. Surpluses have enabled the wealthier families to undertake the hadj (the pilgrimage to Mecca enjoined on Muslims), to build up larger herds of cattle, and to acquire horses and animal-drawn carts.

Nonetheless, these changes have not substantially altered village social stratification or authority patterns. Compound heads and village elders still control internal access to village resources and external access to the villages. No great disparities of wealth have opened in the village, but personal economic mobility is still facilitated by migration away from rather than by achievement within the village itself. At the moment, Gambian villages seem to be avoiding the extremes of radical individualization on the one hand and strong crystallization of class differences on the other. The village has experienced almost continuous change while more or less retaining its strong identity as a unit making communal gains slowly.

C. <u>The Linkages Between Government And Village</u>:

The analyses above suggest that both government and village are oriented to positive change. The question remains how to bring these two social agencies into effective interaction. The present project anticipates project activities at a number of different levels, from individually managed farm enterprises to compound-level forage production to village-level management of the common grazing resources. Close attention will have to be paid to the nature of the relationships that will mould the decision-making process at all those levels.

Until recently, nearly all relationships between the central government and the village were mediated through village leaders. The ox plow training schools were open to anyone who could afford the equipment, which meant in practice that the important and well-to-do received maximum benefits. The danger in placing any new resources in the hands of the well-to-do, of course, is that the benefits may well be appropriated wholly by them rather than passed on to a larger population of less well-off farmers. The present project will go beyond mere reliance on village elders to monitor change at the farm level.

The Rural Development Project has also developed a capacity to reach more directly into the village. Baseline studies for the project assessed compound level socioeconomic processes over a two year period. Picking up where the ODM/ORD or other studies left off, the socioeconomic monitoring unit (SESIMU) of the project is extending field activities so that it can monitor the impact of interventions on a controlled sample of project participants. The result is a capacity to watch impact as it happens and to feed back guidance to project implementors to insure maximum achievement of project goals. Although this process is clearly more expensive and "prying" than leaving village participation to the elders, it neither neglects them in gaining village access nor leaves the fate of the project resources entirely in their hands.

In the current project, a number of linkages will be established to the village. Several activities will be carried on through the Livestock Owners' Associations, and it is necessary to examine these groupings closely to plot the likely effects of working in this way.

The LOA's were, as noted above, stimulated by the Animal Health and Production Department. Forty-two Associations have been organized with one in each district except where distances, numbers of members, or intradistrict cleavages have led to the creation of two. Membership now ranges from 34 in a suburban Banjul LOA to 225 in one part of one upcountry district where cattle densities are especially high. The average LOA now has 107 members but additional enrollments are actively being canvassed at this writing.

All the LOA's either have been or are being registered with the government, have written by-laws and have elected officers. They collect dues and issue membership cards. Since nearly everyone in the country owns livestock, it is important to know who the members and officers are to have an idea of what value the villagers who have joined see in belonging. 1/

1/ The highly tentative hypothesis which follows is formulated by the basis of meetings with nine LOA's, review of the rolls of officers of all forty whose lists have been submitted to the AHPD, and many hours of discussion with members, non-members, outside observers and AHPD staff.

Members of the LOA's repeatedly state that they have come together to make their voices heard by the government in a way that they cannot be heard as individuals. To represent the "voice" of the entire district, members have been recruited from nearly every village within it. So far the village has felt adequately represented for these purposes by one or a small handful of people, not necessarily including the alkali (village head). At the Association officers' level there has been a deliberate attempt to diversify representation of the district in two ways: by selecting people from each major ethnic group and from different villages. In only a few cases are there two officers from the same village, and rarely is the president of the LOA from the village of the District Chief or Seyfo, who normally acts as "advisor" to the organization. There is thus clearly no "packing" of the LOA's by a dominant village or ethnic group in the District.

If representation is broad geographically and ethnically, it may be still loaded in class terms. The question to be asked is what the "livestock owners" have gotten their voices together for. So far - and the situation is still very fluid - it is clear that most of the membership thinks of its group as a cattlemen's association. Most members are herd owners and may be the largest and most respected cattle owners in the village. The women members of LOA's are usually themselves cattle herd owners, although some have exclusively poultry and/or small ruminants. Rarely are there male members who own only small stock, unless they have lost or sold their cattle. Indeed, Gambian languages make the distinction between "livestock" and "cattle" and many members and non-members refer to the LOA as the kafo of cattle owners, not just the owners of all types of stock. Membership cards in some places have as a symbol a drawing of a cow.

The AHPD sees the LOA and its initial orientation toward cattle as a natural but temporary fact of life. The AHPD is actively encouraging small stock owners and women to join. It remains to be seen how the LOA's will evolve, but it is clear that they take their relationships with the AHPD seriously and will respond to their advice. During project implementation, therefore, the socioeconomic unit must watch the growth and evolution of the LOA's with particular care and counsel the AHPD on how to ensure a wide dispersal of the benefits of those project activities that are channeled through them.

III. The Feasibility of Project Interventions

The Gambia Mixed Farming and Resource Management Project involves a large number of activities. Some of these are direct farmer or village level programs that are "ready to go," others need village testing and adaptation, while still others require substantial evaluation and testing before they will be ready for village impact. Each activity, therefore, must be evaluated for its feasibility in social terms. More than that, the total package must be assessed for its likelihood of achieving, in the social context described above, the overall objectives of the project.

A. Project Interventions With Direct Impacts:

These interventions, with notes on feasibility, include:

1. Cattle Trail (Dappo) Marking:

Increased needs for cropland due to the rise in human population and the addition of animal traction equipment have led to more conflict over destruction of crops by livestock. Dappos are traditional routes over which livestock are allowed to pass from water to compound to grazing land. Efforts have been made to delineate the boundaries of these trails by verbal agreement so that crop raisers know when they have a legitimate claim and when they encroach into a cattle trail area. These verbal agreements alone have not always worked, and as pressure on land increases, the need for visible boundaries is more apparent. Since it is the village authorities together who lay out the dappos through their own croplands, there is no danger that the AHPD or cattle owners will seize more than adequate set of access rights as dappo boundaries are marked with pillars. The marking system is also capable of future adjustment by mutual consent among villagers.

2. Farm Carts:

Carts are already used all over The Gambia. Why villages in some areas appear to have a cart per compound while other villages have only a handful in total is unclear. Tying the revolving fund for carts to a monitoring program in technical and economic assessment offers the best way to assure the eventual availability of carts to the greatest number of people. At present carts are strongly desired even on rather stiff credit terms all over the country. As long as the groundnut prices to which repayments are tied are buoyant, prospects are good for the rapid spread of this labor saving

technology. The more that carts come to be owned in every compound, the less likely it is that non-owning individuals will be charged for their use. As intervillage communications grow, as farm practices intensify - with crop residues to be transported, uniformly-maturing rice varieties needing to be harvested and transported in larger loads than before - and as incomes permit the relative luxury of wheeled personal transport, farm carts appear to be an innovation whose time has come.

3. "Back Yard Fattening" Schemes:

The AHPD has already supported six or eight schemes for the fattening of cattle for the market. Crop residues have been provided by the farmers and additional feeds and supplements by the AHPD. Technical and economic results seem moderately encouraging to date. Under the project, the LOA's will be encouraged to attempt more such programs, and to extend them to sheep at least for the major market period at Tabaski. If the pilot schemes succeed, there seems little doubt that rural people will respond rapidly to the new opportunities. Although resources and management to support many such schemes will develop only gradually, support may well be sought from many settlements and even compounds that want to undertake such an enterprise for themselves.

B. Activities With Longer Term Impact Potential On The Village:

1. The Maize Program:

In this case, the Department of Agriculture has already formulated a large-scale test program for an improved maize package. There is evidence that maize has been successful elsewhere in West Africa with rainfall zones equivalent to The Gambia. Substantial questions remain as to finding the appropriate package given the Gambian farmer's labor calendar and family food

preferences. A small market for maize now exists, but it is not known whether a substantially increased maize crop would find a ready market for foodgrain or as feed for animals. On the other hand, if the crop proves a valuable addition to the farmer's cropping system, there appears no reason why it cannot be adopted by the poorer families as well as the wealthier ones. Careful monitoring of the test programs to be undertaken by the maize agronomist will measure the social and economic utility of the crop.

2. Animal Nutrition:

The laboratory, agronomic trials, and experimental herds to be set up to test forage and feedstuff possibilities, given the environmental and social constraints upon Gambian agriculture, all hold the same potential: increased productivity from the fallow and grazing lands and the livestock that use them. There seems every reason to believe that a concentrated effort to improve this neglected sector of the total farm economy is justified. On-farm demonstrations in these programs may be slow to start because Gambian farmers are simply not yet accustomed to making any deliberate effort to raise feed for their animals. The farmer who has livestock may ascribe little direct value to deliberately planting forage crops even if there are obvious soil-improving benefits for his cropping system.

On the assumption, however, that some elements of an improved nutrition package do emerge, there is a further question of the social ramifications of the new technology. If, for example, animal husbandry becomes a more profitable investment, what changes in the national livestock herd can be expected and how will these changes affect patterns of ownership? If improved animal health and nutrition result in greater domestic milk supply, what will be the split of incremental income between the owner, who spends money on drugs or feeds, and his herder, who manages the feed and animal resources on a daily basis? What will the incentives be for either herder or owner to play his full role in the adoption of innovations? How can nutrition trials be run so that they take account of realistic village constraints and not just test what can be achieved under ideal conditions?

3. Range Use Planning And Development:

This is probably the most difficult part of the present project. There is a general lack of knowledge in this area which is probably greater than in any area previously discussed; even the extent of movement across the unmarked boundary with Senegal, and therefore the grazing intensities, are unmeasured. What kinds of controls might be introduced with or without range improvement must be researched. In general, it can be said that any attempt to do long term "zoning" or land use planning must involve the whole village.

Further, involving villagers in discussions as to the long-term disposition of resources must take account of the fact that the poorest villagers may not have a strong voice in village councils, and that additional knowledge may develop which substantially alters the value of some of the resources being discussed. Thus a framework for evolutionary approaches must be laid, much as the Soil and Water Management Project intends to do in one or a few villages with soil conservation techniques. Again, the role of the project socioeconomic unit in collaboration with all the relevant technical experts must play a crucial role in developing plans that are both economically and socially sound.

C. Other Activities:

Several project activities have less direct village impacts but no less important social feasibility issues. The mapping exercise, for example, can be done well or mishandled "socially". If classification maps are done using the standards and specifications of the GOTG rather than the USG/SCS, they will be far more comprehensible on the local scene. Training components at all levels must be geared to Gambian needs. The project socioeconomic unit must be managed so as to leave behind a permanent capability to undertake field research, and not organized simply as a life-of-project control mechanism. From the start of design, there has been a clear understanding that this project is a Gambian one, not a parachuted American idea. Close attention has therefore been paid to the multitude of ways in which project activities can be made to serve Gambian needs, and thus philosophy of approach must see concrete realization in project implementation.

D. The Social Feasibility of the Project as a Whole:

The Gambian farmer is clearly adapted to and is responsive to exogenous economic forces which affect his production. This is not to say that he has quantified every aspect of his productive activities with a view to making decisions on a wholly mechanistic basis. Factors that are not defined primarily in economic terms obviously play a major role in the decision-making in any rural compound in The Gambia. Yet over time the Gambian farmer has been willing to rationalize groundnut production, to shift food production radically, and to bear substantial credit with high repayment rates. Elements of his total farming system which have been ignored by outside forces have lagged behind the favored rice and groundnut crops. Furthermore, while substantial gains in production and thus in income can be derived from these cash crops along - e.g., from premium "Philippine pink" confectionary groundnuts or rice under irrigation - substantial additional gains will come from examining the total system and making improvements on all fronts. Forage cultivation can have the double benefit of increasing soil fertility and improving livestock nutrition; maize cultivation can bring an early food crop and a marketable commodity to be converted into livestock feed. Grazing management improvements may assure fuel wood supplies while increasing available feed resources for animals.

It is the search for and extension of technical and social innovations in these areas that is the central rationale behind this project. The socio-economic unit and the preproject studies have a crucial role to play in fully describing the farming system, especially since the Land Resource Division socioeconomic study, excellent though it most certainly is, was limited to an analysis of the major cropping systems and of packages to improve them. With certain obviously positive activities proceeding immediately - e.g., fattening schemes, farm carts, training aids, veterinary outreach - the technical team will be able to explore the other options already identified in a thorough-going applied research program and to mount those activities found to be valuable as soon as they have been fully tested. With the work of the Rural Development Project Survey Unit (SESDMU) continuing to produce good research material on the basic crops, the USAID team will be able to focus outwards to the rest of the farm operation.

The social benefits from this overall focus should be high. Rice and groundnuts, for all their improvements, have only enabled most Gambian farmers to keep their heads above water in real economic terms or perhaps to make some marginal gains. Margaret Haswell concludes her recent summary of three separate studies of a Gambian village spanning nearly thirty years by stating that it is still "generally impossible for farming to finance itself from within family resources," and that "the common man (is still) subsistence tied." 1/ She notes that Gambian farmers lack savings, but this fact need not be negative if credit for animal production were pervasive and economic. But in fact it is not that farmers spend current income on improved living standards. Disease, low levels of schooling and skill development, and low ability to secure the valued goods of Gambian cultural preference from carts to jewelry to religious learning, all mark the continuing poverty of the countryside. By looking at the total farming system it will be possible to identify a number of gaps where innovations can make the difference between standing still for even more years or getting ahead of rising prices.

1/ Margaret Haswell, The Nature of Poverty, London and Basingstoke, The Macmillan Press Ltd., 1975, p. 185.

IV. Project Activity Replicability

In a project attempting to enhance the productivity of farming over an entire country, even one as small as The Gambia, it is vital to a broad spreading of benefits to ensure that project interventions are replicable within reasonable limits of cost and management expertise. The geography of The Gambia offers one backdrop to replicability since the production systems are roughly homogeneous across the country. The fact that Ministry technicians and infrastructure exist relatively evenly across the rural areas also helps assure that what proves viable in one area can be carried out in another. There seem to be no serious geographic pockets of severe government neglect.

A number of specific features of the project design help foster the potential for replicability. Baseline socioeconomic research, maize and forage trials, grazing surveys, and other descriptive and testing functions carried out across the country will permit development of technical innovations with appropriate consideration to micro-variations at the farm level. The wells program of the AHPD includes tests of the cost effectiveness of wells versus boreholes versus slipways to aid in further planning. The animal health program, the farm carts component, and the fattening schemes will all be done on a credit basis out of revolving funds, built up slowly to ensure adequate management develops apace. The revolving funds will thus be available for expansion of programs after some demonstrations lead participants to fund activities on their own. The heavy emphasis given to training of replacements for the expatriate technicians, for low-level assistants and inspectors to extend Ministry outreach, for LOA members to improve their activities by themselves can be a powerful guarantee that the work to be started by the project itself will be sustained after project involvement by external donors ends.

For the long-term range component - e.g., the development of village resource planning bodies - there is of course the possibility that replicability will be difficult. What works in one village may not work in another given different personalities and local political forces. The Soil and Water Management Unit will be attempting to develop a "strategy" for village level planning. The present project's socioeconomic unit will have the benefit of their experimentation and will be able to counsel in this area as well.

V. Summary: Benefit Incidence

The question of who benefits from USAID projects is critical to recent American aid legislation and policy. The current Administrator of the Agency defines AID's overall strategy as a one favoring "growth with equity."

This project is focussed squarely on this strategy. It seeks to improve the on-farm production and cash incomes of thousands of poor faming families of The Gambia, and it will do so without overturning their social institutions or way of life. It approaches them with respect for the way they live, takes advantage of their own demonstrated readiness to experiment with improved practices, it encourages them to rationalize their entire range of production strategies to get the most returns from their labor inputs while conserving their resources, and it offers them the chance to make substantial profits by adding valuable commodities, especially animal products, to the market place. It can help them to break the poverty that grips them despite thirty years of development projects which have, according to economist Margaret Haswell, only enabled them the most marginal real improvements in their standards of living.

Nearly all the benefits of the project will flow to rural people, and especially to poor rural people. Some urban employment will be created, of course, as the project strengthens the capability of the MANR, and some of the project interventions will be available to the more well-to-do farmers and livestock owners as well as to the poor. But in both cases deliberate attempts have been made to minimize the diversion of benefits away from the poor, by decentralizing training and outreach programs to spread employment, by deemphasizing central veterinary facilities, and by mounting socioeconomic baseline research and monitoring activities with the deliberate purpose of ensuring that benefits are not captured by a favored few.

Nevertheless, not all benefits will flow to the same people or at the same rate. Some project activities will take longer to mature into farm-level programs; others will impact on a small number of people at first, and then will spread if successful.

To portray the incidence of benefits from all project activities, the following table has been constructed. It shows each of the project activities ranged against a variety of categories of people in the villages. It suggests whether benefits will flow to each group, whether benefits will be substantial or slight, and whether benefits will be early or late in starting. It is to be read with the following cautions:

(1) The categories of villagers shown are not mutually exclusive: many women own small stock, some LOA members are traders or money-lenders, etc. The categories are meant simply to name clearly-defined sets of people who stand to be affected by the project.

(2) Only those most obviously affected are so identified. Other categories of people may also be generally or indirectly affected, and of course in the long run the whole village may undergo substantial change.

(3) Most important, for purposes of the table it is assumed that the project management personnel will be socially-sensitive to the village contexts in which they work and will seek to spread benefits as widely as possible. It assumes that the socioeconomic unit will work toward these goals directly. It thus is a best-case presentation, showing what can be done with the project as designed in the field.

	Current LOA Members	Other Large Herd Owners	Oxen Farmers	Owners of Only Small Stock	Herdsmen	Well-to-do Fa	Average Farmers	Farmers with only Poorer Lands	Women	Village Traders/ Money Lenders
Dappo Marking	early	early			early		EARLY		ARLY	
Veterinary Outreach	EARLY	EARLY		EARLY	mid					
Forage Cr Development	LATER	LATER		LATEI		LATER	later			
Maize Development						EARLY	mid	mid	mid	
Carts Program	EARLY		EARLY			EARLY			early	
Cattle Fattening Schemes	EARLY		mid			mid				
Sheep Fattening Schemes				early					EARLI	
Extension Aids	EARLY		mid		MID		mid			

TABLE 2: PROJECTED BENEFICIARIES OF PROJECT ACTIVITIES

NOTES: (1) Early, mid, later refer to probable timing of significant impacts within life of project.

(2) CAPITAL letters refer to relatively intense probable impact; small letters to lighter or more indirect impact.

Since each activity varies in the way it impacts on different categories of people, it is useful to elaborate the table above in narrative form. Project activities and their beneficiaries are as follows:

1. Dappo marking: Livestock owners, herders and farmers all stand to gain from clearly demarcating the cattle trails. The biggest beneficiaries will be the women and average farmers who suffer the greatest losses to food farms near or at the river and have least margin to withstand the damages.

2. Grazing management: Schemes for overall grazing management will take several years to develop. When enough is known about available nutrition, land tenure, and the political economy of village planning, these schemes will have a major benefit to all livestock producers and to farmers for whom the profits in growing forage crops or in adding livestock to their own farms will be more clearly calculable. The largest benefits, though, will go to the large cattle owners whose herd sizes now are beginning to create the pressure on overall resources that this activity is designed to alleviate.

3. Forage crop development: As forage crops are brought into farm rotations, both farmers and stockowners will benefit. Those farmers with more land at their disposal are likely to be able to add forages somewhat more easily than the average farmer who is pressed to plant nearly all his land to food or export crops each year.

4. Maize development: Programs elsewhere in West Africa suggest that maize may catch on very quickly in The Gambia, with some of the crop going to animal feed but most staying in the compound as a food crop. Again well-to-do farmers with land to spare may benefit first. But if yields are high, farmers with poorer lands and women may also see in maize a crop that individuals can plant, harvest, eat or sell for their own purses on the "kaminyango" personal plots.

5. Carts: Channelled through the LOA's, the new farm carts will benefit those members who already use ox-ploughs and are now ready to add a second major mechanical implement to their farming systems. The women in such families are also likely to benefit, since carts will relieve some of their arduous tasks like the carrying of firewood and rice from the swamps.

6. Cattle fattening schemes: Early efforts will be done through the LOA's, whose members will benefit first. In the longer run the schemes will provide a way to finish out aging oxen for the market. They may so prove to be an attractive short-term investment for wealthier farmers and for village and small-town traders and money lenders. The socio-economic unit will prevent project funds from being manipulated by such rural "non-poor" people, but the replicability of the technology may give them the opportunity to benefit anyway.

7. Sheep fattening schemes: Ideally these schemes should be directed at women, who already privately and individually fatten sheep for the Muslim holiday ram markets. Male owners of small stock may benefit as well. This activity is a clear case where project technicians can guide the flow of benefits: to ensure as wide a spread as possible, mechanisms should be found to avoid the bulk of benefits flowing to cattle owners who can benefit in other ways from the project. One idea that has arisen is to organize these schemes through the women's savings organizations that have begun in Lower River Division under the auspices of the RDP. So far there are too few of these to be the only device for ensuring women's participation, but a demonstration that these organizations are capable of making such schemes work might well lead to the creation of such groups elsewhere in the country. In any case LOA's should receive strict instructions as to who may participate in this activity.

8. Extension aids: This activity will increase scientific knowledge of production methods on the part of farmers and livestock owners throughout the country. Specifically it will work through the LOA's. Successful application of animal husbandry aspects of such knowledge on a daily basis will depend significantly on the herdsmen actually tending the animals. To achieve this goal, LOA's may find it useful to organize a kind of "in-service" training for the herders of their area, or the Extension Aids Unit may take its materials directly to the herdsmen. Depending upon the content of specific programs of the Unit, a wide variety of rural dwellers can benefit.

Summary:

The project does not simply promise "something for everyone" in a random way. Project activities have been carefully coordinated to improve the entire mixed farming system of The Gambia, taking into account the mix of livestock and cropping activities in the farm enterprise, aspects of land tenure, and the variety of physical resources in the ecosystem. As a whole (and especially as they are also complementary to the activities of the RDP) the project will bring major improvements to the rural areas. Yet, as can be seen above, not everyone benefits from each activity. The rural population is divided into a large number of subgroups, situated at different locations in the rural economy and social structure. Some categories of people will benefit more than others, some earlier than others.

What is exceptional about this project is that few if any people stand to lose if the project succeeds. There is no predatory merchant class or urban elite ready to swallow the benefits that will accrue; there is no landlord class in a position to dislocate small farmers as land takes on more value; there is no single activity so rewarding that it will throw up a new middle class in the countryside that could distort the power structure in their favor.

Writing of developing work in The Gambia, the present coordinator of the RDP has said that it is doubtful that projects can raise the standards of living for the poorest people alone while neglecting the relatively well-to-do and influential who control village decisions. Using the villages and LOA's, this project will spread benefits throughout the social structure and will produce rural growth with sensitive and equitable treatment for a variety of rural groupings.

ANNEX L.

ECONOMIC ANALYSIS OF PROJECT COMPONENTS

ANNEX L.: ECONOMIC ANALYSIS OF PROJECT COMPONENTS

In many ways, it is extremely difficult to deal with the economic analysis required for this project. The principal reason for this difficulty is that, while the problems of the Gambian rural economy can be enumerated fairly clearly, the project addresses those problems in an evolutionary manner. That is, the project itself is quite explicitly an organized process of economic, technical and social analysis directed toward developing appropriate single technological interventions and/or packages of technologies for solution or, at least, amelioration of the enumerated problems. Since this is the case, the success or failure of the initial activities in the development and testing of technological packages under the various components over the first several rainy seasons will determine the direction and magnitude of the second and succeeding rounds of technological intervention and field extension of proven packages. The process is, therefore, as described in Annex J., Component #5 an open-ended one and the speed with which any particular technological package will be developed and extended to farmers in The Gambia is unpredictable at the outset. Since some considerable specificity in both the timing and costs of project inputs and resultant benefit flows is essential to the presentation of a realistic, quantitative cost/benefit analysis, this project does not lend itself easily to such analysis. Rather than allowing for such an ex ante analysis in this project paper, the project is designed so that the economic analyses of individual component activities are an integral part of the project outputs.

In the same measure, the type of alternative economic analysis suggested in Handbook #3 - i.e. cost-effectiveness analysis - is not particularly relevant since the objectives of the project itself specifically include the analysis of alternative technological strategies for cost-effectiveness in solution of existing problems on the individual component level and the entire project is an effort in organized and targeted research and development and training for the Ministry of Agriculture and Natural Resources for which there is no comparable precedent system in The Gambia.

Given the above, the economic "analysis" contained herein will restrict itself to five areas. They are:

A. Definition of the major problems to be attacked.
B. Definition of the beneficiary population to be reached.
C. Commentary on the input mix selected for the project.
D. Commentary on the expected outputs of the project.
E. Estimation of probable impacts of the project activities and linkages with other rural development activities.

A. Definition of the major problems to be attacked

As described in Annex G. of this project paper, the Gambia DAP and numerous other documents, the Gambian rural economy is today essentially a two-crop system associated with a relatively recent and superimposed system of livestock raising. The two principal crops which largely determine the productivity of the economy on the annual basis are groundnuts and rice. For historical reasons described in Annex K., the predomins flow of development resources into the rural sector have been targeted toward groundnuts as the principal cash crop and rice as the preferred

grain staple. Groundnuts are basically the crop that absorbs the majority of input resources in crop technology, fertilizers, animal power and male human resources. Rice absorbs the bulk of the remaining input resources, including most of the productive energies of women. Animals, particularly in the form of large ruminants, have been introduced into the farming system in a major way only in the last thirty or forty years largely as a response to defined needs to maintain soil fertility, to ameliorate labor bottlenecks with animal power, and as an accessible store of capital where few other alternative investments exist. Unfortunately, economic productivity of farm enterprises in all three areas is still low and there is a high inherent vulnerability in the total farming system due to the natural consequences of weather variation within the Sahelo-Sudanian climate and the vagaries of the international market for the principal cash crop.

In addition to the vulnerability of the evolved farming system, there are constraints imposed by social trends and the sheer physical limitations of a small country with a relatively poor natural resource endowment. These constraints have been detailed in two important source documents. 1/ The major characteristics of the existing farming system which will constrain production and alter patterns of enterprise development in the future are:

1. A growing scarcity of arable land of moderate or better fertility on which to grow the principal crops. The arable land of any country is a function of its natural resource endowment and its physical size. The Gambia has a very limited geographical area , a natural resource endowment of, at best, moderate inherent fertility, and a growing human and animal population. Therefore, land availability, which is the key necessity for an extensive cropping system, is a diminishing resource relative to population. All indicators available to the design team point to the fact that a perpetuation of the traditional extensive farming systems of the past and present is simply not a viable development option over the remaining decades of this century.

2. Coupled with the above factor, there is increasing evidence that the active farm labor force in The Gambia is declining relative to population growth, whereas human dependency on the natural resource endowment is increasing. This is accounted for by migration - both seasonal and permanent - of the young, male laborers to urban and periurban environments in search of more attractive and independent life styles. While this population of migrants is essentially lost to the agricultural labor force, their presence in the country in low-paid seasonal jobs or as unemployed city urban residents results in a net transfer of rural resources to them for support either directly from the compounds and families in the farming communities they left behind or as urban consumers of domestic and imported

1/ M. Haswell, The Nature of Poverty.: A Case-History Of The First Quarter-Century After World War II. The MacMillan Press, Ltd., 1975, and the ODM/ Land Resources Division, The Agricultural Development of The Gambia: An Agricultural, Environmental and Socio-Economic Analysis. Land Resource Study 22, Surrey, England: 1976.

agricultural products. This means that, not only does the Gambian farm family have to intensify agricultural production on the limited land resources it controls, it has to do so with a reduced active labor force by getting greater production per active laborer.

3. The farming system is characterized by poor or non-existent management of lands not under annual crops - i.e. rangeland, fallow, and forestry areas. This is a function of many interrelated factors among which are low productivity of crop enterprises per active laborer, which mandates allocation of all available labor resources to cropping activities simply to maintain a minimal standard of living; marginal lands more appropriate for grazing, which are being put under cultivation; the store of wealth/numerical increase syndrome in livestock maintenance, which leads to ever larger herds with animals of low individual productivity; and simple population pressure on renewable resources like firewood which leads to indiscriminate cutting of the few remaining woodland areas.

4. The diminishing diversity of agricultural production is also a disquieting factor in terms of both number of crops grown, and the actual cropping systems utilized, and the concentration of one class of livestock in development. Major emphasis in the past development efforts have been placed on groundnuts, rice and cattle. While these efforts might be justified in terms of short-term gains for farm families, there is the increased suspicion of heightened vulnerability from monocultural cropping practices; increased risk of excessive damage or complete crop failure due to crop-specific factors like insects, disease or microclimatic conditions; and simply a feeling of opportunities lost for diversification of the production base of the agricultural sector due to overemphasis on a few selected crops and one class of livestock.

5. The farming system has been, furthermore, hindered in the past by a poorly developed and articulated structure within the country to assure continuous development, testing and extension of appropriate technological packages, which are specifically tailored to the Gambian need to intensify both production per unit of land area and per active agricultural laborer.

B. <u>Definition of the beneficiary population to be reached.</u>

In the broadest sense, the entire rural population of the country will be the beneficiary population for purposes of the project. Some elements of the project components, as they are developed, will touch the life of virtually every farm family in The Gambia. However, from reading and field observation, one might add here the following characterization of the most vulnerable farm family situation to the excellent typography

of the rural community contained in Annex K.:

The most vulnerable farm family situation combines the following:

1. Any rural nuclear family compound with less than 12 members, without non-agricultural sources of additional income.

2. Any compound at some distance from the main roads of the country on the upland side living in housing without tin roofs and without utilities.

3. Any compound without access to rice land in the swamp areas along the river and/or without women laborers who possess the necessary skills and experience to grow rice efficiently.

4. Any compound that is newly established within a village area.

5. Any compound where labor is primarily allocated to production of millet, sorghum and/or maize and where cash cropping of groundnuts is a new or necessarily secondary activity.

6. Any compound without means to employ animal power in either tillage activities for crops or general cartage of goods.

7. Any compound whose livestock population is low in absolute terms composed exclusively of sheep, goats and/or donkeys.

8. Any compound which regularly uses credit but obtains such credit from traditional moneylenders in the form of liens against future grain crops and uses such credit for purchase of subsistence goods, chiefly foodgrains.

9. Any compound where the primary activity of the adult male(s) is contract herding of cattle.

It appeared possible and desirable on the basis of these criteria to isolate the population of poorest and most vulnerable compounds for special attention under the project and, indeed, the project design team took considerable pains in the design process to ensure that all interventions tested and extended in the course of the project would, at a minimum, be neutral with regard to adoption by these most needy compounds. In a number of cases - e. g. distribution of farm carts, use of credit facilities - deliberate efforts were made to tilt project benefits in favor of these more disadvantaged compounds. The process by which this was done and the rationale behind the actions is explained in greater detail in Annex K..

In strictly economic terms, it may well be that the immediate effects of this deliberate effort to isolate and service a particular sub-set of the most disadvantaged compounds is to reduce the aggregate IRR or cost/benefit calculation results below those that could have been obtained by targeting interventions to the most innovative and affluent farm families. If this is so, it is probably a short-run phenomenon at worst and one that AID is specifically committed to assume through promulgation of the

"new directions" mandate.

C. Commentary on the input mix selected for the project.

The input mix for the project revolves basically around the six person long-term technician team to carry out activities under the various components with their designated Gambian counterparts and the additional local senior staff to be given additional training through the project. Since the project is essentially concerned with research and development of appropriate technology, one would expect the principal expenditures for project activities to be spent on either obtaining expatriate expertise as in the case of the American university team or in developing local human resources through external and domestic training programs. Considerable discussion among the design team members concerned the exact composition of the expatriate team that would assure minimum coverage for all essential project activity areas at reasonable cost. The proposed team represents the final consensus of the team. It is particularly gratifying, given the extremely limited scope for employment of U.S. technicians due to the extremely high support costs of overseas employment, that the team chose to strongly support the resource commitment of an agricultural economist and a rural sociologist for the socio-economic unit with the attendant costs of local field personnel. Their presence on the implementation team promises to fulfill the commitment to a thorough testing of all project interventions from social and economic and technical viewpoints and allows for appropriate ex ante participation of social scientists in the developing of interventions.

All of important inputs in the project seem to flow logically from the composition of the long-term team, the selected components for concentration, and the needs of the target group of benefit beneficiaries.

D. Commentary on the expected outputs of the project.

Upon completion of Phase I of the project, the following outputs can be reasonably expected to have materialized:

1. Detailed, large-scale land use classification maps will have been prepared for the five administrative Divisions of The Gambia and appropriate local expertise for the interpretation of aerial photography, simple cartography, and the use of land use maps in resource planning and field implementation of planning activities will have been developed.

2. A permanent national land use planning capability will have been created within the Ministry of Agriculture and Natural Resources-with the assistance of the Soil and Water Management Unit-which will have embarked on a sound program of legislated, controlled grazing areas with necessary planning for stock access routes, firebreaks as needed, forestry shelter belts, and other facilities for livestock.

3. A national resource inventory will have been conducted, range composition surveys completed on an annual basis, a national groundwater use plan developed, and an adequate data base for range management planning with Livestock Owners Associations and other appropriate local groups will have been established.

4. Pilot programs for use of forage crops on fallow land and on native rangeland to increase feed supplies for livestock and foster improved soil fertility and structure will have been introduced and tested.

5. A technological package for improved maize production for use as food, feed grain and a forage source will have been thoroughly evaluated with testing on selected farms.

6. Credit for the purchase of approximately 400 improved farm carts per year will have been provided and approximately 10 percent of the total farm community will have benefitted directly from the program. As a result of the provision of the farm carts, farmers will have to use greatly reduced the human energy expenditures on transport within the farm compound, and will have been trained in use of the farm carts for auxiliary tasks like better storage of crop residues for animal feeds and improved utilization of animal manures in crop production.

7. A series of pilot actions dealing with improved husbandry practices for poultry, small ruminants and cattle will have been tested and introduced through the Livestock Owners Associations.

8. Each of the Livestock Owners Associations will have diversified and, at least, doubled their membership and will have received extensive training as groups in the organization and conduct of their affairs as producer associations.

9. Each of the Livestock Owners Association will be assigned the services of a fully qualified Livestock Inspector to provide continuous guidance and liaison in field programs.

10. Each Mixed Farming Center will receive the services of a qualified Livestock Assistant, whose primary role it will be to integrate animal husbandry interventions with existing programs in crop husbandry.

11. The socio-economic unit will have recorded and analyzed continuous farm records over the life of the project on a representative sample of compounds as part of its monitoring function.

12. A project-trained cadre of field enumerators and data processors will exist within the Ministry for the permanent socio-economic section of the PPMU.

13. By its interaction and organized process of investigation into rural problems, the project team with its Gambian counterparts will have demonstrated and instilled in Ministry personnel the new methods of working in an interdisciplinary manner to solve problems and develop appropriate new technologies for the farmer.

14. A functioning Extension Aids Unit will be in place within the Ministry as a Ministry-wide service facility. This unit will have greatly improved its capacity to prepare, reproduce and disseminate appropriate materials relating to project intervention and Ministry programs.

15. Thirteen Gambian senior technicians will have received advanced level participant training in various key agricultural skill areas and will form the core of new technicians needed to assume future leadership roles in the Ministry.

16. At least 50 percent of the farm compounds in The Gambia will have received either formal or informal training on improved farming technologies through the Ministry improved and intensified extension outreach program reinforced by project activities.

17. The training curriculum for entering extension agents of the Ministry will have been revised to present a uniform course in basic skills prior to specialized training for all personnel and regularly scheduled in-service training and re-training courses for existing Ministry personnel will have been initiated.

It is estimated that the above outputs of the project are reasonable targets for achievement in the first five years of project intervention. The collective impact on the Ministry of Agriculture and Natural Resources and on the rural community cannot be quantified at this time but will be recorded and evaluated by the socio-economic unit during the life of the project.

E. <u>Estimation of probable impacts of the project activities and linkages with other rural development activities.</u>

In essence, the proposed project is a major effort in research, development and training for the Gambian agricultural sector. It is intimately linked

through joint efforts in design to the IBRD/Rural Development Project and the development of the RDP Phase II program. When taken and evaluated together, the projects hold out distinct possibility for major positive changes in the rural sector. Between them, they treat the rural family compound as an integrated farming system for the first time and address themselves to the needs of that system through strengthening appropriate enterprise technologies and stressing the interrelationships and interdependencies that exist between crop and livestock activities. The focus on creative use of production credit in both programs through the Gambia Cooperative Union's new consolidated pattern of district level cooperative branches can only bring beneficial changes and added strength to the rural financial system. The training of technical and support staff for the Ministry under both programs will ensure that a cadre of well-trained and field-experienced local specialists will be available in the near future to wholly assume to the burdens of executing rural programs. The buildup of training and research facilities for mixed farming programs at Genoi, Sapu and YBK upcountry and in the Yundum/Abuko area near the capital will assure that the country has a functioning system of interrelated agricultural research centers throughout the rural areas to permit permanent stationing of senior personnel in close proximity to their rural clientele. Finally, the institutionalization of socio-economic unit for planning and evaluation within the Ministry, coupled with improvements in the research station network, should assure for the first time the continuous flow of agricultural innovation and appropriate technologies that will be so critical to the successful evolution of the Gambian farming system(s) over the remainder of this century and beyond.

ANNEX M.

ADMINISTRATIVE ANALYSIS OF PROJECT COMPONENTS

ANNEX M.: ADMINISTRATIVE ANALYSIS OF PROJECT COMPONENTS

This analysis of administrative factors which may affect the project is the result of detailed observation of the Ministry of Agriculture and Natural Resources' operations and staff over the period from November 1976 to September 1978. Ministry budgets for four budget years have been analyzed; virtually all senior-level personnel of the Ministry and a large segment of the junior staff have been interviewed and/or observed in the field in performance of their various assignments; Ministry staff performance vis-a-vis its rural clientele has been carefully monitored over time in question and answer sessions with over 3,000 farmers and numerous other farmer group observations in the field; and, finally, Ministry performance vis-a-vis previous AID/GOTG activities in The Gambia have been evaluated on the basis of existing AID records and in-house staff discussions.

Before specifically addressing the six separate areas of concern outlined for consideration in Handbook #3 for the administrative analysis, it is best to lay out the administrative structure within which the project will function.

The principal agencies which have been involved in the design and/or will be involved in the implementation of the project are the Ministry of Agriculture and Natural Resources (MANR) of the Government of The Gambia; the AID office in Banjul; technical assistance support specialists from REDSO/WA in Abidjan; and an American Title XII land grant university. The first three of these have collaborated intimately in the complete process of conceptualization of this project from the initial starting point of the AID Gambia DAP exercise in November 1976, to the PID submission in February 1978, to the final design of the project as represented by this project paper.

The project, as designed, will be implemented by the MANR with support assistance of the AID office in Banjul in the person of an AID direct-hire project manager and the technical assistance of an American Title XII University team consisting of 5 long-term specialists and a number of short-term consultants as called for in the six project components. The responsibility for the implementation of the project will be in the Office of the Minister of the MANR in the person of the Permanent Secretary, who is the highest ranking civil servant of the Ministry and its principal executive officer. For purposes of administration, planning and execution of project activities, and coordination with all other donor agencies with projects in the field of rural development, the project will function through two permanent units of the Ministry within the Office of the Minister. They are the Program Planning and Management Unit (PPMU) and the Project Coordinating Committee (PCC). The former is the overall planning and programming unit of the Ministry at a supra-Departmental level and consists of the Permanent Secretary, the Directors of all operational branches of the Ministry, the Managing Director of the Gambia Produce Marketing Board (GPBM), the Managing Director of the Gambia Livestock Marketing Board (GLMB), the project manager of the IBRD/RDP, and such other representatives of other Ministries of the Government as are requested

to participate by the Permanent Secretary - e.g. representatives from Economic Planning, Finance, the Central Bank, the Office of Central Statistics. The Unit is supported by a permanent professional planning staff of Gambians and expatriates consisting of the following specialists: agricultural planning/macroeconomics, agricultural marketing, cooperatives operations, agricultural credit, agricultural statistics, and a number of technical agricultural skill areas like animal science, veterinary medicine, agronomy and forestry. To the existing expertise will be added the skills provided by AID in the form of U.S.D.A. personnel in the Ministry Soil and Water Management Unit.

The professional team provided under this project will become an integral part of the PPMU and will work through the Unit in performance of its daily project implementation tasks with the various operational Departments of the Ministry - e.g. the maize agronomist with the Department of Agriculture; the range management/ecology specialist and the animal nutritionist with the Department of Animal Health and Production; the forage agronomist with both Departments; and the agricultural economist and the rural sociologist with all Ministry Departments. Routine team representation and liaison at PPMU meetings will be the primary function of the AID direct-hire project manager and the university team's designated chief of party, who will be one of the team specialists. All other technicians will work directly at the PPMU planning staff level and attend general PPMU deliberations as called upon for technical expertise.

Project coordination with other donor agencies will be conducted formally through the PCC. This committee consists of the Permanent Secretary, the Directors of all Departments, and the Managing Directors of the GPMB and the GLMB with representatives from all external donors having projects in rural development. Primary representation on the PCC will again be through the AID project manager and the university team's chief of party. And, of course, in a country as small as The Gambia, there is always adequate scope for informal contact, discussion and coordination in daily activities on an informal level with all major donor representatives for all team members.

With regard to the six specific areas of concern listed in Handbook #3, the following comments are submitted:

1. <u>Local Leadership</u>

In regard to the leadership of the Ministry in the persons of the Permanent Secretary and the Directors of the operational Departments, one observes a cadre of young professionals, mainly in their 30s and 40s, with a minimum of university training at the Bachelor's level. A substantial number have advanced degrees or other training in specialized fields and all have extensive on-the-job experience. Over the two years of observation prior to the design of this project, there has been a consistently high level of expertise and leadership displayed in all the senior management positions of the MANR, even though personalities have changed in several of the key positions - e.g. the

Permanent Secretary has been changed once, the Director of the Department of Animal Health and Production as has changed, and the Director of Hydrometeorological Services has changed. In all cases of personnel change, except at the Permanent Secretary level, incumbents have moved to higher positions within the Government structure and been replaced by trained personnel from within the staff ranks of the MANR with technical expertise in relevant fields. The personnel in key positions of the Ministry are, thus, technocrats by professional training, personal inclination and Government civil service regulations. While there is no question that all of these technicians represent a technocratic elite within the country by virtue of their superior educational and job experiences, there is no particular evidence of excessive family, tribal or interest group involvement in or manipulation of their selection for the positions they hold in the bureaucracy. In all cases under observation in the office and the field, officers of the Ministry have displayed good to superior knowledge of their jobs and personal leadership in Ministry dealings and in relationships with their rural clientele.

Since the second and third levels of senior officers are similar in background and training to the present leaders in the MANR - and those leaders themselves are still relatively young men - one can only project a reasonable continuity in both quality and style of leadership for the Ministry over the foreseeable future.

2. Structure

A.) With regard to the legality of the implementing organization, the MANR is the rural development agency of the Government of The Gambia. It is a permanent agency. It has full legal authority to implement all project activities as envisaged. There is nothing anticipated under the project that would be impossible to accommodate either within the present mandate of the Ministry or through Ministry appeal to the Office of the President and, through it, to the legislative apparatus of the Government.

B.) The pattern of internal MANR operations, as it relates to the project, has been described above in the analysis. There are no discernable strategic weaknesses in the Ministry structure that could be predicted to irreparably hinder project implementation. There is a strong current within the Ministry planning and operations at present - and extending back over several years - toward elimination of the weaknesses associated with an inherited system of administration that saw the various Departments of the Ministry as essentially independent actors under the general Ministry umbrella with separate budgets and separate work programs which were rarely tightly coordinated with one another. The present articulation of the Ministry's planning and coordination apparatus through the PPMU and the PCC are the most obvious examples of this trend; but other developments like the evolution toward a joint training curriculum for all Ministry extension personnel before specialized training, the field placement of staff from different Departments in unified groups at the Mixed Farming Centers to service the rural populace, the pooling of vehicle and other supply resources, and the joint preparation of Ministry outreach and extension programs for the media confirm the favourable movement.

C.) With regard to informal structure and operations of the Ministry, one can observe, as in any organization of any size, dominance in certain areas by strong and ambitious personalities. In a situation where resources are definitely finite, there is considerable activity and jousting among Departments and between senior personalities within them to justify programs and/or pet projects. However, there is no particular evidence that this is, in any sense, a destructive or inhibiting factor to project implementation and, in an overall context, it is probably more affected by the whims, prejudices, plans and approachability of the various external donor agencies than by the internal conflicts themselves. Ministry operations give every evidence from the outside of being lively, dynamic and flexible in approach with regard to both competition for available resources and mutual cooperation in support of agreed programs.

3. Role and Commitment

The role of the MANR has been discussed in numerous places in this paper and is largely self-evident by its title. The activities in the project were designed in direct collaboration with the Ministry over the past two years and are wholly compatible with the Ministry's mandate and overall planning. Although there are several activities in the project which are "new" in the sense of impetus and funding availabilities - e.g. range management activities, more intensive land use planning - there are no activities that there outside the stated agenda of the Ministry and the Government. Project activities have been endorsed at all levels of the Ministry structure and, more importantly, in organized and numerous meetings with the rural populace through the Livestock Owners Associations, the Gambia Cooperative Union branches, and other rural organizations. Through these organizations and regular Ministry radio programs, a very large percentage of the farm families in The Gambia has already heard about the key activities to be undertaken by this project and, indeed, have participated themselves in a very real way in decisions as to the priorities set for the project.

There are numerous incentives built into the project for existing and future Ministry staff. These incentives include but are not limited to better professional training opportunities, expanded program responsibilities, increased job and promotion opportunities, increased field work and, therefore, increased travel allowances, and the like.

4. Resources

The Ministry in implementation of the project is backed by the full resources of the Government. With the training, commodities and other funding to be supplied under the project and the existing human resources of the country, there is every evidence that a sound and adequate base already exists and can be built upon to implement project activities. Implementing agencies in developing countries can always, in the larger sense, be said to be understaffed and underfinanced as those factors are key constraints to any development process. However, the Gambian situation is certainly no worse in this regard than the situation in many neighboring countries participating in the CILSS program. The two major areas of personnel weakness as regards project activities are the lack of Gambian agricultural economists and rural sociologists but,

in many ways, the country is considerably better off in trained manpower vis-a-vis its size and the total number of rural people than its neighbors. To the extent that critical weaknesses, which would hinder field operations of the project design, they have been dealt with through project inputs. The project has been explicitly designed, however, to account for the present and likely future capacities of the Ministry's Departments to handle project activities. Great stress has been placed on better utilization of existing resources - i.e. training facilities, laboratories, field stations - and on upgrading the professional skills of existing personnel, rather than adding great quantities of new manpower to the Government payroll or facilities and equipment that require inordinate amounts of time and money to maintain and operate. Great stress has also been placed on setting up a process to develop and extend agricultural interventions directly to the farming community in such a way that the major responsibility for adoption and execution of the interventions falls, not with the Government, but with the individual farm families and the self-organized farmer groups like the Livestock Owners Associations and the women's cooperative work groups.

5. Outside Administrative Environment

One of the most impressive factors in the development of this project, which is remarked upon by almost every technician who played any part in the process, is the extensive and enthusiastic participation of the rural people of the country in the formulation of project priorities. Through direct contact with farmer groups that represent a good cross-section of the rural populace and numerically represent, perhaps, ten percent of the total rural compounds, there has been much two-way interchange on project activities, present Ministry programs, and more general development issues. During the entire period of these meetings over the last two years, there has been a continuous evidence of mutual respect and appreciation of Ministry activities to date. Where there have been failures in programs, farmers have not hesitated to stand up in public meetings - with the media present - and strongly express their dissatisfaction with both overall Ministry efforts and individual technician performance. In this regard, the climate for interaction, criticism and constructive collaboration in project activities is demonstrably as good or better than that in any other country participating in the CILSS program. This climate is obviously fostered by the democratic traditions of the existing Government and the fact that the rural populace is actively encouraged to and does participate in the political process. Rural people in The Gambia fully realize that they can personally affect the future directions of the development of their country. Interactions with government officials are direct, frequent and open on both sides. Organized farmer groups can easily and freely express both their satisfactions and discontents with the course of Ministry planning and implementation and do not hesitate to do so openly. It is, in brief, a very healthy climate in which to begin project activities.

6. Grass Roots Managerial Considerations

The direction and intensity of benefit flows from the project to

identifiable groups within the rural community of The Gambia are shown and discussed in Annex K.: Social Soundness Analysis of Project Components. The principal organized but non-governmental agencies within the country which will participate directly and formally in the project are the Livestock Owners Associations of which there are forty-two. These associations will be key designers, testers and adopters of project interventions like livestock fattening trials, the farm carts program and the improved forage program. It is planned that all activities promoted through the LOAs will be self-sustaining in technical, economic and social terms. In order to accomplish this, LOA members will participate in international training and observation tours, in-country training courses at the YBK training center, and individual association training sessions in credit and supply management and the organizational aspects of running their own associations more effectively. Since these LOAs are already organized with executive committees and regular meeting scheduled and are registered with the Government as producer representative groups, an institutional structure and base of talented local farmers is already available to start project activities.

635-0203

GAMBIA

MIXED FARMING + RESOURCE MANAGEMENT

PROJECT PAPER

ANNEXES

N - S

PART III of III

ANNEX N.

IMPLEMENTATION PLAN FOR THE PROJECT

I. PROCUREMENT PLAN

This plan will outline the scope of the required procurement, the responsibilities of the procuring agency(ies) involved and the steps to be followed in implementing procurement actions.

1. The control of goods and services under this Grant will be the responsibility of the Ministry of Agriculture and Natural Resources of the Government of The Gambia. The Ministry of Agriculture and Natural Resources, upon acceptance of this procurement plan, will designate their official(s) responsible for local procurement and will specify their method of control and/or documentation of such procurement. The Ministry has indicated a preference for procuring goods and services for the project from U.S. sources to the maximum extent possible and an inability to accomplish this procurement itself in accordance with AID regulations. AID/Banjul, therefore, upon receipt of an official request for U.S. procurement from the Ministry of Agriculture and Natural Resources, will assist the Ministry in locating an acceptable Procurement Services Agent.

2. Procurement Services Agent (PSA): All commodity procurement in the United States for this project will be accomplished through a PSA identified by AID/Banjul and authorized by the Ministry of Agriculture and Natural Resources. The Afro-American Purchasing Center (AAPC) in New York would be the probable PSA. AAPC is currently acting as the PSA for a number of current projects funded through AID/Dakar and the Mission is familiar with their operations and performance. They are fully qualified to serve as the PSA with regard to this project and have prior AID/Washington approve to perform this service. AAPC's fee for procurement services is negotiable and will be determined in this case, prior to procurement activities, by the Government of The Gambia, AID/Banjul, AID/Dakar and/or other USG agencies qualified to serve this need.

3. Technical Assistance, Training and Construction Services: We anticipate that all technical assistance to be provided under this project will be accomplished through institutional service contracts with the Government of The Gambia, U.S. AID and the selected institution(s) as tri-partite signatories to the contractual agreement. It is anticipated that Project Component #1 for Land Resources and Use Evaluation, Classification and Cartography will be accomplished through the issuance of two separate contracts for services: First, a contract for aerial photography of The Gambia as specified by Component #1 and a detailed Terms of Reference; and, Second, a contract for photo interpretation, land resource and use classification, cartography, and in-country training of Gambians in photo interpretation and utilization of maps in development planning. All other technical assistance required for Project Components #2 to will be sought through an institutional contract with an American Title XII University and other agencies with prior development experience. It is anticipated that the large majority of professional technical services required will come directly from the selected Title XII institution. AID General Regulations will apply to all these contracts and the selection of the Title XII university will be conducted through the established BIFAD committee procedures. According to AID

regulations, the request for proposals from firms, other than the contractual agreement through the Title XII mechanism, will be advertised in the Commerce Business Daily and issued to qualified institutions on the basis of the standard BID evaluation procedure. AID/W will assist in selecting the awardee by the normal selection procedure.

Engagement of all technical assistance will be by Project Implementation Orders/Technical with authority from the Government of The Gambia's representative in the Ministry of Agriculture and Natural Resources. Participant training programs, as detailed in Annex J., Project Component #7, will be filled by candidates selected by the Government of The Gambia and training will be implemented through Project Implementation Orders/Participant as issued by AID/Banjul with the approval of the Host Government.

Construction under the project will be advertised for U.S. and local firms. Proposals will be solicited through the Commerce Business Daily for U.S. participation. It is anticipated, however, that U.S. firm interest in construction in The Gambia will be minimal. It is likely, therefore, that actual construction contracts for facilities will be awarded to construction firms licensed to operate in The Gambia. Competitive bidding will be sought through the Government of The Gambia's normal procedures which have been used and determined adequate for other AID-financed projects.

4. Procurement Sources and Origin: It is expected that all direct procurement of goods and commodities using foreign exchange will be from the United States (Code 000). Under local cost procurement of goods and/or services - as shown in Annex O, Table 3 - approximately 75% will be Gambian in source and origin.

5. Payments: Payment to the PSA for services rendered will be made by the Direct Letter of Commitment method. Upon receipt of the PIO/C in AID/W (SER/COM/BFD), the Letter is sent to AAPC to initiate procurement. When AAPC has completed its purchasing actions, documents are presented to the AID Controller's Office in New York for payment.

   For local payments, procedures established by the Regional AID Controller in Dakar will be followed.

6. Delivery: All commodities ordered and imported into The Gambia will be shipped on the basis of costs, insurance and freight (CIF) to the port of Banjul. The PSA will provide all-risk marine insurance in the amount of 150% of the CIF cost of the commodities. AID's normal marketing requirements for overseas shipments will be carried out by the PSA.

7. Receipt, Inspection and Utilization: The Grantee is held responsible for the proper reception and port clearance (exonerations) of all incoming project commodities. Inspections of incoming shipments must be made and receiving documents will be used to comment on damage and/or losses.

Damage/loss reports will be made expeditiously so that claim actions can be effected against the suppliers or carriers. AAPC will act on the behalf of the Grantee if it receives reports regarding shipments from the United States.

The Grantee will be required to submit to AID/Banjul receiving reports of all project-related goods released from the port.

II. SOURCE/ORIGIN WAIVERS

Discussion: As discussed in the body of the procurement plan, the majority of the procurement under the project will be of US and cooperating country source and origin, however, it is essential that allowances be made for Code 935 country procurement for certain components.

1. Vehicles

Vehicles of US manufacture are extremely rare in the Gambia, and are generally used by a few employees of the American Embassy. There are no local dealers for any US-made vehicles and therefore no spare parts, repair manuals or any personnel trained to service American vehicles.

Visits were made to several local vehicle dealers to survey their facilit capabilities and performance. Those visited included Mercedes-Honda (Autos); Taunus-Land Rover-Toyota (land cruiser only); Bedford-Massey Fergusson (farm tractors); Volkswagen - Honda (Cycles). All of the shops were either clearly inadequate or non-existent except that for VW-Honda (Cycles) which was reasonably well equipped and operating in a normal fashion. They also had a good stock of spare parts for Honda. The Taunus-Land Rover-Toyota dealer had some parts for Taunus only. The manager told me that he had just started importing Toyota land cruisers because of the price advantage over Land Rover. He imports parts for the latter two makes on a case-by-case basis from Dakar, Senegal. The shop was severely crowded. The majority of vehicles had evidently been there for some time. Tools, personnel and equipment were also in short supply.

Most of the trucks owned by the GOG are serviced and repaired in government run garages. Those of the Ministry of Agriculture are the responsibility of the Agricultural Mechanical Workshop at Yundum on the outskirts of Banjul. The shop superintendent, Mr. Mamburay, served an apprenticeship and had several years experience in Great Britain. The shop is large and well maintained but could use more hand tools and equipment. Spare parts are stocked in the workshop. They are ordered through local dealers and imported periodically since local dealers' stocks are practically non-existent. Adequate parts for Peugeots are stocked in Senegal and come by road from there. Parts from Britain are normally received within two months by sea.

The fleet consists of 19 sedans and mini-buses of various makes, over a hundred Peugeot 404 pick-up trucks, 40 heavy trucks (20 Bedford), about a hundred Land Rovers, 60 Massey-Fergusson farm tractors, two Caterpillar Crawler Tractors, one Aveling-Barford motor grader and 150 motorcycles (mostly Honda). Mr. Mamburay has been trying to standardize on the principal makes mentioned above but a recent program aided a new make, 11 Commer trucks.

Major repairs are all done in this shop but three service and minor repair stations have been established in the interior of the country at Sapu, Kenoi and Basse. This project would set up another minor maintenance unit at YBK an assist in improving the facilities at Yundum.

The UNDP has provided some International Harvester (IH) vehicles for a project in The Gambia. All repair and parts service for these vehicles are to be supplied by CFAO, the agent in Dakar, Senegal. The report of the REDSO/WA Engineer on the CFAO-IL facilities in April, 1978, indicates that this maintenance capacity is totally inadequate for IH utility vehicles (Scout) and trucks and only marginal for construction equipment.

The attached memo, dated July 19, is the result of a site inspection made by the REDSO/WA Procurement Specialist. It indicates that IH is still not in a position to support their equipment in Mali, another country adjacent to Senegal. It is not realistic to expect that CFAO-IH will develop an adequate support capability to support a much smaller fleet in The Gambia in the near future.

In light of the above discussion of service, maintenance and repair facilities in The Gambia, the potential for improvement and the Ministry of Agriculture's attempt to standardize on a limited number of makes and models, it is requested that a waiver be granted for proprietary procurement of the following items with their related attachments and initial spare parts from Code 935 sources.

Vehicle Description	Source	Qty	Value Delivered Banjul
A. Land Rover, 4-wheel drive, all terrain vehicles with long-wheel base @ $18,000 each POE	Great Britain	6	$108,000
B. Land Rover 4-wheel drive, all terrain vehicles with short-wheel base @ $13,000 each POE	" "	3	39,000
C. Bedford* 7 ton, all terrain trucks @ $25,000 POE	" "	2	50,000
D. Bedford* 22-passenger bus @ $25,000 POE	" "	1	25,000
E. Honda 50cc all terrain motorbikes @ $600 POE	Japan	54	32,400
F. Honda 120cc all terrain motorcycles @ $1,200 POE	Japan	20	24,000
G. Massey-Fergusson Mod. 165 tractors 3 point hitch and draw bar @ $20,000 POE	Great Britain	3	60,000
H. Massey-Fergusson double disc harrows @ $5,000 POE	Great Britain	3 units	15,000
I. Honda Motorbike repair kits @ $50 POE	Japan	54 sets	2,700
J. Honda motorcycle repair kits @ $100 POE	Japan	20 sets	2,000

2. Construction Components

A code 935 source and origin waiver is requested for fittings, metal door and window frames, plumbing, emergency generator and electrical items to be used in the construction of the new houses (5) in Banjul.

3. Shelf Items Waiver

Because of the very small volume of business in this small country, the quantity and selection of shelf items is very limited. The majority of manufactured items sold locally are imported to order from Senegal. A waiver is requested to include Senegal as a procurement source on the same basis as The Gambia for shelf items.

UNITED STATES GOVERNMENT

memorandum

DATE: July 10, 1978

REPLY TO ATTN OF:

SUBJECT: IH Activities in Mali

TO: Files

From: Bendeguz Viragh

I visited the IH rep. Societe DIAMA, in BAMAKO to review the IH maintenance facilities and spare parts support in Mali.

Bill Gill already did a report on IH in Mali in March and concluded that "Diama is an IH dealer in name only", and that it cannot be considered a viable dealership for the manufacturer. Thereafter, during a visit by CFAO/PARIS president Nicholas and several teams of IH officials we were assured that Bill's report was either in error or was overtaken by events, i.e., IH has moved into Bamako and established spare parts and maintenance support in anticipation of vehicle sales to AID financed activities.

Regrettably, my visit confirmed that Bill Gill's assessment was correct and that Mr. Nicholas and the IH people were once again talking but not acting. Diama is, as Bill pointed out a quite impressive repair facility which handles Toyotas and other makes, with apparent ease and technical competence. It has, however, not one IH spare part on hand. Mr. LeRidant, the maintenance manager explained that IH has not even sent them a parts catalog and therefo he has not been able to place any orders for spare parts. As such, and since he has no spares, Diama has not been able to repair an IH Scout which was purchased under one of the AID projects and which has been sitting at Diama for over two months.

As of today, therefore, IH vehicles cannot be repaired in Bamako.

I am requesting AID/W to bring this report to the attention of IH/USA It is clear, however, that once again IH promises were not met and that in spite of the various visits of IH and CFAO people to the Sahel, their best intentions remain verbal. As such, IH is causing a rapid erosion of their once favorable image which was created by the numerous and energetic announcements of their export efforts in the Sahel.

Buy U.S. Savings Bonds Regularly on the Payroll Savings Plan

U.S. Government Printing Office: 1978—241-830/3018

OPTIONAL FORM NO. 10 (REV. 7-75) GSA FPMR (41 CFR) 101-11.6 5010-112

III. CRITICAL PERFORMANCE INDICATORS

1. Purpose:

The following indicators have been established against which the implementation of the project can be measured. Assuming authorization of the project and obligation of the first year's funding in [illegible], respectively and timely obligations of adequate funds in future years, the critical performance indicators represent a realistic and attainable schedule for movement of the project.

2. Actions:

11/78	Final approval of the Project Paper.
12/78	Initial ProAg and Implementation documents signe
1/79	Recruitment process for Title XII University participation begins with issuance of project Terms of Reference and advertised Request for Proposals through the Title XII BIFAD committee.
	PSA agreement is negotiated with the Government of The Gambia, U.S. AID, and the selected PSA.
	GOTG submits final plans for technician housing ~~and preliminary plans for the YBK Training Center~~; plans are reveiwed by REDSO engineers and approved; Requests for Proposals are advertised for U.S. and locally licensed construction firms.
2/79	Procurement of essential project equipment is initiated by the selected PSA for U.S. equipment and by GOTG and AID/Banjul for local purchases.
1/79	Construction contract for technician housing is awarded and construction begins.
1/79	Title XII university contract is awarded and university selected begins final selection of staff and preparations for fielding of the team.
	Terms of Reference for two contracts under project component #1 for the aerial photography exercise and subsequent land classification and mapping activities are completed.
5/79	Requests for Proposals for aerial photography and photo interpretation and mapping contracts are issued in the Commerce Business Daily and bids are received.
6/79	First group of participant trainees are selected and processed for departure.
	Contracts are awarded for aerial photography and photo interpretation activities.
7/79	Essential project equipment begins to arrive in The Gambia.
	Technician housing is completed.

9 8/79 First group of participating trainees are sent to the United States for training.

Furnishing are installed in technician housing and utilities are functional.

Final plans for renovation of YBK Center and construction of the new dormitory are approved and RFPs are issued.

10 9/79 Project technician team arrives with their families.

Project technician team conducts a series of in-count field observation and orientation tours as a group.

First Peace Corps Volunteers for project arrive for in-country training.

Initial selection of local candidates for in-country project positions begins.

Project office is set up at Abuko.

~~10/79~~ Comprehensive project team planning sessions are held to plan detailed work schedule through ~~March,~~ October 1980.

6/80 Fencing of demonstration and range grazing trial areas is initiated by fencing crews.

Socio-economic unit enumerators are selected and given short-course training.

Office and other project staff are hired from Gambian candidates.

Renovation work on existing YBK Center is started by the selected construction contractor.

Range Ecologist starts baseline inventories of existing plant communities.

Grazing areas and livestock trails demarcation is begun across the country with distribution of concrete markers

The GOTG submits a national groundwater use and development plan to initiate the water point development activity under the project.

Forage Agronomist evaluates existing work on forage crops in The Gambia and begins planning experimental design for grass/legume introduction gardens at YBK and Yundum.

Forage Agronomist begins organized program for seed collection and treatment from local grass/legume species with the Range Ecologist and places orders for additional seed of exotics for 1980 trials.

Maize Agronomist begins reviews of all maize program activities in The Gambia and evaluation of research data available in-country; orders are placed for necessary commodities for 1980 trials.

11/79 Visit by Agricultural Engineer consultant allows project team to finalize design for improved farm carts and order is placed for an initial 400 carts.

Terms and administrative procedures for the farm cart program are finalized with the Gambian Cooperative Union officials and the LOAs.

Animal Nutritionist commences feeding and animal husbandry trials at Yundum for evaluation of local feed by-products and salt/mineral supplements.

Seedstock poultry unit operations at Abuko are expanded with project assistance.

Forage and Fiber Analysis Laboratory is set up at Abuko and commences operations ~~with the assistance of the Biochemist consultant~~.

12/79 First annual livestock census of all livestock classes is initiated.

Socio-economic unit begins field operations with farm baseline study.

Peace Corps Volunteers finish in-country training and are assigned to project responsibilities.

Film production workship is held with the assistance of short-term specialist.

8/80

1/80 Gambian participant trainees in laboratory operations and agricultural statistics return from overseas training and begin work in the Laboratory and Socio-Economic unit, respectively.

Aerial photography is flown for the entire country under contract.

Socio-economic baseline study continues.

First annual campaign for cattle and small ruminant growing-out through the LOAs is initiated.

Livestock census is completed and analyzed.

2/80 Photo interpretation and land classification activity is initiated under contract.

Socio-economic baseline study is completed. 9/80

Renovation of YBK Center is completed and construction of the new dormitory starts.

Local extension agent and farmer training activities begin at the YBK Center.

Ministry stations permanent core staff at the YBK Center.

3/80 Fencing of initial areas for grazing trials, forage demonstrations and other activities is completed.

Distribution of the improved farm carts is initiated through the Gambian Cooperative Union and the LOAs.

Project team holds second comprehensive planning sessions to review progress to date and lay out plans through October 1980.

4/80 Detailed planning proceeds for forage, maize and range grazing trials to be conducted during the rainy season in 1980.

Detailed monitoring program for representative cattle herds, sheep flocks and goat herds is initiated by the Animal Nutritionist.

Socio-economic unit issues an interim report on the results of the farm baseline study and finalizes plans for the continuous monitoring of sample farm compounds.

Cattle and small ruminant growing-out campaign is completed with marketing of the animals through the Gambia Livestock Marketing Board and results are analyzed.

5/80 New dormitory at the YBK Center is completed and local training activities are expanded.

First Gambian farmer observation tour is conducted.

LOAs complete self-help construction of storage sheds and receive stocks of equipment ~~and veterinary supplie~~ for Association use.

Equipment and supplies for Ministry veterinary field clinics are distributed. All clinics are now fully functional.

6/80 First ten watering points are completed by Ministry drilling crews.

Field preparation for forage and maize trials is initiated.

Range survey begins and forage samples are collected for laboratory analysis.

Gambian animal nutritionist returns from participant training and assumes position as Director of the Laboratory.

7/80 Report on the first animal growing-out campaign is issued by the project team.

Candidates for the ~~second~~ participant training group are selected and processed.

8/80 Participant trainees depart for training.

9/80 First annual project report is issued by the project team.

Second group of Peace Corps Volunteers arrives in The Gambia for in-country training.

10/80 Project team analysis of rainy season trial activities begins.

Marketing economist drafts research plan with socio-economic unit for marketing study.

10/80 Project team holds ~~third~~ second comprehensive planning sessions and finalizes work plans through March 1981.

Agricultural engineer consultant formulates recommendations for simple farm structures to handle crop residues for animal feed.

11/80 Campaign for improved handling of crop residues for animal feeding is initiated with selected LOAs.

12/80 Preliminary results from range survey are assembled and tentative recommendations for range management plans are discussed with selected LOAs.

Second livestock census is conducted.

1/81 Socio-economic unit issues report on farm compound survey for crop season 1980.

First fifteen watering points are completed by the Ministry drilling crews.

Second campaign for cattle and small ruminant growing-out projects with 20 LOAs participating is initiated.

Workshop on graphics and visual aids support materials development is held for the Extension Aids Unit personnel.

2/81 Preliminary recommendations for technological packages for maize production are considered by the team and form the basis for second year trials in 1981.

Preliminary recommendations for small ruminants and poultry packages are formulated for testing with selected LOAs.

3/81 Laboratory assembles an interim report on livestock feeding trials to date and the results of feed and forage analyses conducted over the first year of operation.

Project team conducts ~~fourth~~ third comprehensive planning sessions and finalizes work plan through October 1981.

4/81 Second campaign for animal growing-out is completed with sale of the animals.

Socio-economic unit issues an evaluation report on the farm cart program to date.

5/81 Results of the marketing study are issued by the socio-economic unit.

Distribution of farm carts continues with an additional 400 carts in 1981.

Detailed planning for ~~second-year-of~~ field trials is completed.

Second range survey begins and trial range management activities are developed with selected villages.

Second Gambian farmer observation tour is conducted.

5/81 Trials on fenced plots and farmers' fields are installed.

8/81 ~~Third~~ Second group of participant trainees departs for training.

9/81 Project team issues second annual report.

10/81 Project team holds ~~fifth~~ fourth comprehensive planning sessions and finalizes work plan through March 1982.

12/81 Training methodology and evaluation workshop is held.

Workshop on rural radio program production and reception systems for extension agents is held.

First 25 watering points are completed.

Recommendations are presented by the project team for revisions in the training curriculum for Ministry extension agents.

1/82 Analyses are completed on second crop season activities and reports are issued.

Third animal growing-out campaign is initiated with 30 LOAs participating.

Final sets of land classification maps and aerial photo sets are completed and presented to the GOTG.

Workshop in the interpretation and use of aerial photos and maps in land use planning and management is held.

Maps, ~~groundwater development plan~~, and results of range surveys form the basis for land use planning and range management schemes for LOAs.

2/82 Accelerated work on range management schemes with selected LOAs.

3/82 Project team holds ~~sixth~~ fifth comprehensive planning sessions with finalization of work plan through October 1982.

4/82 Planning continues for third rainy season of grazing, forage and crop trials.

6/82 Third rainy season of trials begins.

Third range survey is initiated.

Third group of participant trainees is selected and processed.

~~9~~ 12/82 Third annual report is ussued for the project.

~~10/82~~ Fe Animal Nutritionist issues report on animal growing-out programs to date with feeding and husbandry recommendations in collaboration with a senior animal husbandry consultant.

Socio-economic unit issues a comprehensive report on farm compound observations over first three years of the project.

10/82 Range ecologist issues comprehensive report on three years of detailed observations on range conditions with interim recommendations on range resource planning and management.

Maize agronomist issues report on three years of work on the maize program with extension recommendations for extension agents and farmers.

Project team issues report on the conomics of the farm cart in increased farm efficiency.

Forage agronomist issues report summarizing work to dat

Project team proposes revised curriculum for extension agents based on their teaching innovations over the first three years.

Laboratory issues a comprehensive report on nutrition analysis work and feeding trials in collaboration with the biochemist consultant.

U.S. maize agronomist concludes his tour and is replaced by his Gambian counterpart who has returned from U.S. training to take his place as a project team member.

Project team holds seventh comprehensive planning sessions and finalizes work plan through March 1983.

11/82 Project team presents its formal recommendations for design elements to be included in the Phase II project.

12/82 Workshop on extension and communications methods is held.

First 40 watering points are completed.

Project team organizes all materials for project evaluation team.

1/83 AID project evaluation team conducts full field evaluation of the project to date.

Fourth animal growing-out campaign is initiated and involves all 42 LOAs.

Grazing management schemes are planned with selected LOAs.

3/83 Project team holds eighth comprehensive sessions and finalizes work plan through October 1983.

5/83 Preparations for the fourth rainy season of cropping, forage and range trials are completed.

Maize trials concentrate on farmer field testing and extension of the appropriate to farmer adopters.

Grazing areas survey enters fourth year of observation.

8/83 Design of Phase II of the project is completed and project paper is submitted to AID/W.

9/83 Project team issues fourth annual report.

10/83 Project team holds ninth planning sessions to finalize work plan through September 1984 and organize transfer of project responsibilities to the Gambian technician counterparts.

10/83 Socio-economic unit is formally institutionalized within the Ministry of Agriculture and Natural Resources.

12/83 Project team issues formal recommendations of technical packages for farmer adoption in maize production, forage production, handling and storage of crop residues, handling of animal wastes for improved crop production, animal health practices, general animal husbandry practices, livestock growing-out projects, grazing resource management, etc.

X First 55 watering points are completed.

1/84 Gambian technicians assume the major planning role on project team for detailed planning of rainy season activities.

Fifth animal growing-out campaign is initiated.

3/84 Project team holds tenth comprehensive planning sessions to finalize plans for completion of Phase I of the project and undertake implementation activities for Phase II.

5/84 X All 60 watering points under the project are completed.

6/84 Fifth rainy season activities begin under direction of the Gambian project team.

9/84 Project team issues comprehensive termination report on the Phase I project.

9/84 Phase II project begins implementation activities.

ANNEX O.

FINANCIAL PLAN FOR THE PROJECT

Financial Plan for the Project

The total United States contribution to this project will be $6.0 million. Approximately 26% of the budget will consist of local procurement and services; the remaining 74% will be reserved for foreign exchange purposes.

Funding is scheduled for six separate but interrelated project components that will be implemented simultaneously during the five year Phase I of the project. Allocated funds in each component will be variously utilized for technical assistance, commodities and supplies, training, construction, operating costs, revolving funds and the like. Provisions were set up for interest payments on revolving fund disbursements to farmers of 11% per annum. This rate conforms to the standard rate of interest charged to farmer credit purchases under the IBRD Rural Development Project. It is approximately the real commercial bank rate for the Gambia.

All financial transactions necessary for the implementation of this project are shown in the following tables:

Table 1 Summary of Project Costs by Functional Category
(dollars in thousands)

Functional Category	FY 79	FY 80	FY 81	FY 82	FY 83	Total
I. Technical Assistance	849	600	810	360	360	2,979
II. Training	-	45	161	51	11	268
III. Construction		328	9	-	-	337
IV. Equipment and Supplies		318	431.4	-	-	749.4
V. Revolving Fund Accounts		125	125	-	-	250
VI. Operating Costs		106	106	106	106	424
Total Direct Costs	849	1,522	1,642.4	517	477	5,007.4
Inflation @ 10% compounded	-	152	305.6	141	186	784.6
Contingency @ 5%	-	76	82	26	24	208
Grand Total	849	1,750	2,030	684	687	6,000.0

Table 2 Breakdown of Project Costs by Project Component
(dollars in thousands)

	Project Component	FY 79	FY 80	FY 81	FY 82	FY 83	Total
I.	Land resource and use evaluation, classification and cartography	849	-	-	-	-	849
II.	Grazing areas development and management	-	292	272	101	101	766
III.	Improved crop and forage production and management	-	510.35	484.05	127.5	127.5	1,249.4
IV.	Improved rural technology	-	141	152	-	-	293
V.	Strengthening ministry evaluation and planning capacity	-	494.5	477.5	237.5	237.5	1,447
VI.	Agricultural skills training and communications	-	84.15	256.85	51	11	403
	Total direct costs	849	1,522	1,642.4	517	477	5,007.4
	Inflation @ 10% compounded	-	152	305.6	141	186	784.6
	Contingency @ 5%	-	76	82	26	24	208
	Grand Total	849	1,750	2,030	684	687	6,000

Table 3

Breakdown of Project Costs by Functional Category and Financial Classification
(dollars in thousands)

Functional Category	Foreign Exchange	Local Costs	Total
I. Technical Assistance	2,979	-	2,979
II. Training	233	35	268
III. Construction	57	280	337
IV. Equipment and Supplies	556.4	193	749.4
V. Revolving Funds	-	250	250
VI. Operating Costs	-	424	424
Total Direct Costs	3,825.4	1,182	5,007.4
Inflation	470.6	314	784.6
Contingency	125	83	208.0
Grand Total	4,421	1,579	6,000.0

Table 4

Detailed Breakdown of Project Budget
(dollars in thousands)

Funding Item	FY 79	' 80	Y 81	' 82	FY 83	Total
I. Technical Assistance	849	600	810	360	360	2,979
A. Long Term:						
1. Range Ecologist	-	120	150	90	90	450
2. Forage Agronomist	-	120	150	90	90	450
3. Maize Agronomist	-	90	180	-	-	270
4. Agricul. Economist	-	120	150	90	90	450
5. Rural Sociologist	-	120	150	90	90	450
B. Short Term;						
1. Aerial Photography	400	-	-	-	-	400
2. Land Classification, cartography & training	449	-	-	-	-	449
3. Range Management Specialist	-	20	20	-	-	40
4. Agricultural Engineer	-	10	10	-	-	20
I. Training	-	45	161	51	11	268
A. External Participant Training:						
1. 15 person years as per list in component #6	-	45	118	51	11	225
2. Workshop on training methodology	-	-	35	-	-	35
3. 6-month applied training on farm structures	-		8	-	-	8

	FY 79	FY 80	FY 81	FY 82	FY 83	Total
III. Construction	-	328	9	-	-	337
1. Technician Housing - 5 houses @ $65,000	-	325	-	-	-	325
2. Crop storage demonstration units	-	3	9	-	-	12
IV. Equipment and Supplies	-	318	431.4	-	-	749.4
A. Vehicles	-	(185.2)	(178.2)	-	-	(363.4
1. Six 4-wheel drive all terrain vehicles with long wheel base @ $18,000 POE	-	54	54	-	-	108.0
2. Three 4-wheel drive, all terrain vehicles with short wheel base @ $13,000 POE	-	13	26	-	-	39
3. Two 7-ton, all terrain trucks @ $25,000 POE	-	25	25	-	-	50
4. 22-passenger bus @ $25,000	-	25	-	-	-	25
5. Cinema van @ $25,000	-	-	25	-	-	25
6. Twenty 120 cc all-terrain motorbikes @ $1,200 POE and Fifty-four 50 cc motorbikes @ $600 POE	-	28.2	28.2	-	-	56.4
7. Three tractors with oil bath cleaner, 3 point hit and draw bar @ $20,000 PO		40	20	-	-	60

	FY 79	FY 80	FY 81	FY 82	FY 83	Total
B. Vehicle Equipment:		(15.8)	(9.2)	-	-	(25.0)
1. Jerry cans @ $30 POE		.4	.4	-	-	0.8
2. Three trailers for tractors @ $1,500 POE	-	3	1.5	-	-	3.5
3. Three double-disc harrows @ $5,000 POE	-	10	5	-	-	15
4. Motorbike repair kits @ $100 POE for 120 cc and $50 POE for 50 cc	-	2.4	2.3	-	-	4.7
C. Laboratory and Field Testing Equipment	-	(10.9)	(45.6)	-	-	(56.5)
1. Two electric forage driers @ $3,000	-	-	6	-	-	6
2. Forty-five Chatillon Dynometer Scales (25 lb capacity)	-	2.5	2	-	-	4.5
3. Six Toledo balances (500 gram capacity)	-	1.2	.6	-	-	1.8
4. Triple beam balances (Six) (25 lb capacity)	-	1.2	-	-	-	1.2
5. One seed grader	-	-	5	-	-	5
6. Two commercial-type maize shellers (small scale)	-	-	20	-	-	20
7. 6,000 Burlap bags	-	4	8	-	-	12
8. 2,000 Cloth bags	-	2	-	-	-	2
9. Two plant presses with pressing and drying materials	-	-	1	-	-	1
10. Ten tube-type 10-gram Gray metric scales	-	-	.3	-	-	0.3

	FY 79	FY 80	FY 81	FY 82	FY 83	Total
11. Ten vegetable sampling frames	-	-	.5	-	-	0.5
12. Eight pocket stereoscopes	-	-	1	-	-	1
13. 1,000 Vegetation sampling forms (SCS - Range - 417)	-	-	1.2	-	-	1.2
D. Socio-economic Unit Equipment	-	(21.0)	-	-	-	(21.0)
1. Sixty clipboards	-	0.3	-	-	-	0.3
2. Twelve measuring wheels	-	1.2	-	-	-	1.2
3. Twelve measuring tapes	-	0.3	-	-	-	0.3
4. Twelve compasses	-	0.3	-	-	-	0.3
5. Ninety shoulder bags for equipment	-	1.4	-	-	-	1.4
6. Six calculators with printout	-	0.6	-	-	-	0.6
7. Two Texas Instuments SR 59 calculators with printers	-	0.6	-	-	-	0.6
8. One 100k desk-top mini-computor (Horizon North Star) with teleprinter, CRS, visual display, floppy discs, cassetts, tape input, storage capacity & SPSS software package	-	16	-	-	-	16
9. Six calculators without printout		0.3	-	-	-	0.3

	FY 79	FY 80	FY 81	FY 82	FY 83	Total
E. Office Equipment and Supplies	-	-	(25.0)	-	-	(25.0)
1. Two electric typewriters	-	-	1.5	-	-	1.5
2. Three manual typewriters	-	-	0.5	-	-	0.5
3. One photocopier	-	-	1.6	-	-	1.6
4. One mimeograph machine	-	-	1.0	-	-	1.0
5. Ten desks	-	-	1.6	-	-	1.6
6. Six tables	-	-	0.6	-	-	0.6
7. Ten filing cabinets	-	-	1.0	-	-	1.0
8. Thirty chairs	-	-	0.7	-	-	0.7
9. Ten desk lamps	-	-	0.5	-	-	0.5
10. Six sets of camping equipment for bush trips (stove, tent, sleeping bag, cot, mosquito net, etc.) @ $1,000	-	-	6.0	-	-	6.0
11. Book sets for technical library	-	-	7.0	-	-	7.0
12. Miscellaneous office supplies	-	-	10.0	-	-	10.0
F. Fencing and Miscellaneous tools		(35.6	(50)	-	-	(85.6)
1. 33,000 meters of 3 meter woven wire	-	11	24	-	-	35
2. 66,000 meters of barbed wire	-	6	10	-	-	16
3. 12,000 creosot-treated fence posts	-	8	16	-	-	24
4. 88,000 fence staples	-	4.4	-	-	-	4.4
5. Fifty hand scythes	-	0.7	-	-	-	0.75

	FY 79	FY 80	FY 81	FY 82	FY 83	Total
6. Fifty garden rakes	-	0.75	-	-	-	0.75
7. Twenty heavy duty hammers	-	0.3	-	-	-	0.3
8. Twenty shovels	-	0.4	-	-	-	0.4
9. Twenty fencing tools	-	0.4	-	-	-	0.4
10. Twenty wire cutters	-	0.4	-	-	-	0.4
11. Four fence stretchers (c-clamp style)	-	0.2	-	-	-	0.2
12. Four fence stretchers (2 pulley rope style)	-	0.2	-	-	-	0.2
13. Fifty hand-operated maize shellers	-	0.5	-	-	-	0.5
14. Ten grass shears	-	0.1	-	-	-	0.1
15. Four mechanic tool kits @ 600 POE	-	2.4	-	-	-	2.4
G. Equipment for Training and Communications	-	(24.5)	(23.9)	-	-	(48.4)
1. One portable video-tape set (camera, microphone, tape recorder, playback, monitor, and part-3/4" color)	-	-	7.0	-	-	7.0
2. Fifty video cassettes, one hour length	-	-	2.5	-	-	2.5
3. Fifty transitor radios		4.0	-	-	-	4.0
4. Two reel-to-reel tape recorders		0.5	-	-	-	0.5
5. Production and processing of film		2.0	9.3	-	-	11.3

	FY 79	FY 80	FY 81	FY 82	FY 83	Total
6. Recording tapes and cassettes	-	1.4	-	-	-	1.4
7. Six cassette tape recorders	-	0.9	-	-	-	0.9
8. Training materials and supplies	-	15.0	5.0	-	-	15.0
H. Forage and Feed Analysis Laboratory	-	-	89.5]	-	-	(89.5)
1. Fiber analysis apparatus	-	-	3.0	-	-	3.0
2. Wiley Mill Grinder	-	-	0.5	-	-	0.5
3. Water bath	-	-	0.5	-	-	0.5
4. Kjeldahl conbination unit for distillation and digestion (12 unit, electrical)	-	-	5.0	-	-	5.0
5. PH meter	-	-	1.0	-	-	1.0
6. Drying oven	-	-	6.0	-	-	6.0
7. Muffle oven furnace	-	-	1.5	-	-	1.5
8. Two precision balances	-	-	3.0	-	-	3.0
9. One hundred Gooch-type crucibles @ $5	-	-	0.5	-	-	0.5
10. Assorted laboratory glassware	-	-	10	-	-	10.0
11. Assorted clamps, rubber tubing connectors, etc	-	-	1	-	-	1.0
12. Chemicals and reagents	-	-	2	-	-	2.0
13. Water distillation unit	-	-	0.5	-	-	0.5
14. Two air conditioning units for laboratory	-	-	1	-	-	1.0
15. Exhaust system for laboratory	-	-	3	-	-	3.0
16. Renewable chemicals, reagents and glassware	-	-	40	-	-	40

	FY 79	FY 80	FY 81	FY 82	FY 83	Total
17. Atomic absorption spectrometer (Minerals except phosphorous)	-	-	10.0	-	-	10.
18. Spectrophometer (phosphorous analysis)	-	-	1	-	-	1
I. Miscellaneous Equipment and Supplies	-	(25.(	(10.0)	-	-	(35.0)
V. Revolving Fund Account	-	125	125	+	-	250
A. Funds for purchase of equipment by farmers	-	125	125	-	-	250
VI. Operating Costs						
A. Personnel		(79)	(79)	(79)	79)	(316)
1. Office Support	-	11	11	11	11	44
2. Field Work	-	21	21	21	21	84
3. Enumerators	-	47	47	47	47	188
B. Vehicle Maintenance	-	21	21	21	21	84
C. Materials	-	6	6	6	6	24
1. Seed and fertilizer						

Table 5 Estimated Host Country Contribution
(dollars in thousands)

	Functional Item	FY 79	FY 80	FY 81	FY 82	FY 83	Total
I.	Salaries and indemnities for local personnel	160	196	196	196	220	968
II.	Values of sites and services	96	8	8	8	8	128
III.	Operating Costs	40	40	40	40	40	200
	Total	296	244	244	244	268	1,296

(22% of total U.S. contribution)

ANNEX P

PID, PID COMMENTARY

AGENCY FOR INTERNATIONAL DEVELOPMENT

PROJECT IDENTIFICATION DOCUMENT FACESHEET

To Be Completed By Originating Office

1. TRANSACTION CODE: A (A = Add, C = Change, D = Delete)

PID

2. DOCUMENT CODE: 1

3. COUNTRY/ENTITY: THE GAMBIA

4. DOCUMENT REVISION NUMBER:

5. PROJECT NUMBER (7 digits): 635-0203

6. BUREAU/OFFICE: A. Symbol AFR; B. Code

7. PROJECT TITLE (maximum 40 characters): GAMBIA MIXED FARMING AND RESOURCE MANAGEMENT

8. PROPOSED NEXT DOCUMENT: A. 3 (2 = PRP, 3 = PP); B. DATE MM YY 0678

9. ESTIMATED FY OF AUTHORIZATION/OBLIGATION: a. INITIAL FY 79; b. FINAL FY 83

10. ESTIMATED COSTS ($000 or equivalent, $1 =)

FUNDING SOURCE		Life of Project
a. AID Appropriated		
b. OTHER U.S.	1.	10,125
	2.	
c. Host Country		2,500
d. Other Donor(s)		
	TOTAL	12,625

11. PROPOSED BUDGET AID APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. Grant	PRIMARY TECH. CODE D. Loan	E. FIRST FY F. Grant	E. FIRST FY G. Loan	LIFE OF PROJECT H. Grant	LIFE OF PROJECT I. Loan
(1) S H	B 114	078		2,068		10,125	
(2)							
(3)							
(4)							
			TOTAL	2,068		10,125	

12. SECONDARY TECHNICAL CODES (maximum six codes of three positions each)

13. SPECIAL CONCERNS CODES (maximum six codes of four positions each): BR, BF

14. SECONDARY PURPOSE CODE: 144

15. PROJECT GOAL (maximum 240 characters)

To foster the intensification and integration of crop and livestock enterprises within the Gambian farming system so as to contribute to increasing rural family incomes on an ecologically sound and sustained yield basis.

16. PROJECT PURPOSE (maximum 480 characters)

Increase efficiency and productivity of the farm enterprises through better land resource planning and management; improvements in animal husbandry, crop husbandry, and crop rotation; training of farmers and agricultural support personnel; establishment of a socio-economic planning and evaluation unit in the Ministry of Agriculture and Natural Resources.

17. PLANNING RESOURCE REQUIREMENTS (staff/funds) Resource Management, Contract, Animal Husbandry Specialist, Contract. Livestock Economist, REDSO/WA. Anthropologist/Sociologist, REDSO/Contract. Tropical Agronomist/Contract. Training/Communication Specialists REDSO/WA Contract. Civil/Agricul.Eng. REDSO/WA. Animal Health Veterinarian-Gambia. Cooperatives and Credit Specialist/Gambia. Contract Cost: $58,000

18. ORIGINATING OFFICE CLEARANCE

Signature

Title: Regional Development Officer

Date Signed MM DD YY

19. Date Document Received in AID/W, or for AID/W Documents, Date of Distribution MM DD YY

AID 1330-2 (3-78)

PROJECT IDENTIFICATION DOCUMENT

GAMBIA MXED FARMING AND RESOURCE MANAGEMENT PROJECT

I. DESCRIPTION OF PROJECT

A. Summary of the Problems

The Republic of The Gambia is one of the smallest countries in Africa being some 250 miles in length and 15 to 30 miles in width. It is surrounded on three sides by the Republic of Senegal. Agriculture - defined as crop husbandry, animal husbandry and fishing - is the most important economic activity in the country. It accounts for over 60 percent of gross domestic product, provides a livelihood for more than four-fifths of the population, contributes more than 95 percent to export earnings, and forms the basis for the principal processing industries. Agriculture in The Gambia is largely rainfed crop husbandry and traditional livestock raising. Irrigated agriculture is practiced only on a small area. Land under annual cultivation is estimated at approximately 400,000 acres with additional landholdings in fallow, woodland, and permanent grazing areas. Farm enterprises are carried out on small holdings by family units normally averaging 12 persons. These farming units (dabadas) pool their labor and resources and divide the work tasks between men and women. In addition, migrant labor--the so-called "strange farmers"--enter the rural work force on a temporary basis under direct payment or crop-sharing arrangements. Finally, agricultural labor is not differentiated into crop and livestock specializations. Most farm units in the country maintain both crop and livestock enterprise combinations within the same farming system.

Besides groundnuts, which are by far the most important cash crop, there are other minor cash crops, including palm kernels and cotton. Rice, millet and sorghum are the traditional food crops, which are mostly consumed on the farm. Maize is overall a minor crop, but it is very important in certain upriver areas and among certain tribal groups. There has developed historically in The Gambia a pattern of heavy economic dependence on the annual groundnut production as the major cash crop. At the same time, traditional production of food crops is not sufficient to meet domestic consumption, entailing continued reliance on food imports--chiefly rice--which represent on the average nearly one-third of annual consumption requirements. Similarly, farm enterprise development involving livestock has been neglected in proportion to its potential economic value for the total farming system.

In the present Five Year Development Plan for the period 1976-1980, the Government of The Gambia (GOTG) has taken cognizance of the economy's structural weaknesses and vulnerability posed by the heavy dependence on a single primary crop. The central thrust of the Plan is toward intensified development of the rural sector and, particularly, toward increased diversification of agricultural production and better management of rural resources.

Underlying problems which must be dealt with effectively if the Gambian agricultural system is to develop to the greater benefit of the rural population can be grouped in four categories:

1. Problems related to the growing population pressures--both human and animal--on a limited land resources base in a harsh ecological zone.

2. Problems related to the low productivity of traditional crop and livestock enterprises within the farming system.

3. Problems related to the lack of adequate rural infrastructure to support a modern, intensive system of agricultural production.

4. Problems related to the low level of general education and, particularly, the very limited exposure to modern agricultural technology among the rural population of The Gambia.

These underlying problems pose serious dilemmas for the rural population of The Gambia; and for the Government in seeking to address the issues of environmental damage from overgrazing and indiscriminate devegetation, soil depletion, and the general loss of productivity inherent in the current agricultural system of the country. Increasing population has placed additional pressures on the land and water resource base--pressures that result in more acres cleared, more livestock grazing, and more cutting of wood. Efforts to extend traditional crop and livestock enterprises to an ever-increasing land surface, simply to provide a minimal standard of living for a population increasing at a rate of 2.8 percent per annum, lead inexorably to greater conflict level among farm enterprises; dry season cultivation of rice <u>versus</u> utilization

of these areas for forage reserves for livestock, shortening of fallow periods and longer continuous planting of soil-depleting crops, using of scarce agricultural resources on even more marginal croplands, and excessive removal of the forest cover. Resource degradation is the direct result of these greater land pressures. Similarly, intensification of agricultural production is difficult due to a lack of adequate development resources and proven adapted technologies. As will be seen in the following paragraphs, the situation is particularly bad on land that is not under annual cultivation of crops because external donor agencies have tended to concentrate their attention and available resources on existing cropland while neglecting the equally important problem of the management of fallow and non-crop lands. This situation has resulted in a non-integrated approach to rural resource management and is the primary reason for the interventions proposed in this project.

B. Relation of the Proposed Project to Country Development Strategy and Host Country Priorities

Given the nature of its economy and geographical location, the Government of The Gambia recognizes that it must make every effort to maximize its opportunities and manage its resources to develop the rural sector. The Government's first significant movement away from almost total dependence on British assistance in agriculture was the formulation of the four-year $11.7 million Rural Development Project (RDP) in collaboration with the IBRD/IDA, the British Ministry for Overseas Development, and the Arab Bank for Economic Development in Africa.

This project, which is now in the second year of implementation, focuses on agricultural development with major components in agricultural extension and training, cooperatives development, agricultural production credit, seed multiplication, crop extraction roads, and adult numeracy. The RDP is oriented toward crop husbandry at the farm level and complementary extension support services within the Department of Agriculture of Ministry of Agriculture and Natural Resources (MANR). Primary crop emphasis is on technological crop packages, variety screening, and seed multiplication for rainfed foodgrains: rice, sorghum, and millet. Groundnuts are included as the primary cash crop.

The IBRD/IDA has recently undertaken exploratory discussions with the GOTG on the content for the expanded Phase II RDP to begin in 1980. This exercise has helped the Gambian Government to focus its thinking on the optimal future husbanding of external donor assistance in the rural sector. Under Phase II RDP geographic expansion is envisaged to encompass the eastern half of The Gambia instead of concentrating efforts only in the western Divisions as under Phase I. Actual programmatic content for this second phase is still under consideration, but certain broad donor guidelines are already clear in Ministry discussions. These are as follows:

1. The IBRD/IDA assistance will continue to be concentrated on rainfed foodgrains, and groundnuts, and irrigated rice variety screening.

2. The People's Republic of China will give assistance in irrigated rice extension.

3. The EEC/EDF will direct its contributions toward expansion of production credit for crop packages and overseas training of Gambian personnel.

4. The UNDP and FAO agencies will assist in bolstering local agricultural planning capacity, including marketing.

5. The African Development Bank will continue its efforts to promote cotton as an alternative cash crop.

Various Arab fund sources have allocated funds for reconstruction and upgrading of the primary roads for the length of the country on both the north and south banks of the Gambia River. Kuwait is funding an integrated transportation study to rationalize the utilization of river transport with the new road network.

In addition to the above, and in consonance with the GOTG's expressed wish that AID concentrate its expertise on integrated rural resource management, specialized support services will continue as scheduled: AID is about to embark upon a program to establish a Soil and Water Management Unit within the MANR, and regional and Gambia-specific crop protection activities are moving forward with AID and FAO assistance under the auspices of CILSS.

AID is currently examining the feasibility of assistance in revegation/reforestation in conjunction with other donors through CILSS and the Club du Sahel.

With this backdrop of other donor assistance to the rural sector of The Gambia and in considering the likely components of the expanded RDP, tripartite discusssions involving GOTG officials, representatives of the IBRD, and AID staff members isolated one major area of concern which was not being adequately covered by any donor. The area was integrated resource management on non-cropland with appropriate livestock and forestry elements. Discussions furthered revealed to all parties:

a. Recognition that the mixed farming nature of Gambian agriculture necessitates efforts to develop both crop and non-crop enterprises at the farmer level;

b. Recognition that preliminary estimates of IBRD/IDA funding availabilities for Phase II RDP do not permit extensive involvement in non-cropland development activities.

It is clear from discussions with the GOTG that in the general field of agriculture, the MANR has determined that its two highest priorities under the CILSS first generation program focus upon halting environmental degradation and improving the renewable resource base. AID's concentration on mixed farming systems, soil and water management, and revegetation meet this imperative squarely.

These general program conclusions are directly in line with the results of concurrent internal discussions among AID/Washington, REDSO/WA, and AID/Banjul on development strategy for The Gambia. The Development Assistance Paper (DAP), which was prepared in November 1976, and the series of program guidance cables that AID/W has issued since that time all identify resource management activities as an area of prime concern. The final design for the Soil and Water Management Project for The Gambia was completed in 1977. AID/Washington subsequently has indicated a strong interest in receiving for consideration preliminary project documents for complementary efforts in mixed farming and resource management and in forestry. This PID is presented as a response in the former area of concern.

C. Purpose to be Achieved in this Project

The purpose of this project is to foster the intensification and integration of crop and livestock enterprises within the Gambia farming systems so as to contribute to increasing rural family income on an ecologically sound and sustained yield basis.

D. Project Components (Inputs)

The principal agency for the design and implementation of this project will be the Ministry of Agriculture and Natural Resources Within the Ministry, the Department of Agriculture, Forestry, Cooperation, Animal Health and Production, Hydrometeorological Services, and the Soil and Water Management Unit will participate in the formulation and implementation of the project components listed below under the coordinating authority of the Office of the Minister in the person of the Permanent Secretary. The two principal vehicles for planning and coordination of project activities will be the Interdepartmental Planning Unit of the Ministry and the Project Coordinating Committee. The former is the agency within the Ministry charged with overall rural development planning. The latter is a permanent committee, chaired by the Permanent Secretary, which coordinates all in-country activities of external donor agencies having programs in agriculture fields.

The project is formulated as a five-year effort to run from FY 1979 through FY 1983.

The components proposed for inclusion in the project are discussed below under seven separate sub-headings. It should be recognized at the outset, however, that these components are not discrete packages unto themselves but highly interrelated and mutually supportive actions upon whose joint success depend the benefits of the project.

1. Land Resources and Use Evaluation, Classification and Cartography

The Gambia, being a small country with a relatively high human (280 per sq. mile of arable land) and animal population density per square mile, is increasingly faced with problems of conflict over land utilization. These conflicts are particularly acute between crop and livestock enterprises in the farming system as farmers attempt to increase the area of land used for foodgrain and cash crop production under extensive cultivation methods at the same time they attempt to increase their holdings of animals, which rely heavily on the same land for extensive grazing. As

unplanned and unregulated cropping of new areas proceeds apace with growing livestock populations and unmanaged grazing, fallow periods are reduced, ever more marginal land is brought under the plow, and the total land resource deteriorates. Intensification of both agricultural and livestock enterprises on defined units of land is difficult due to the low productivity of traditional farming systems.

The situation obviously calls for increased governmental and community effort in the area of resource planning and, in its broadest sense, conservation. This effort is hindered, however, by the fact that no detailed evaluation of Gambian land resources and use patterns has ever resulted in the large-scale land classification cartography that is so essential for effective land use planning.

The first component of the proposed project, therefore, is to remedy this situation by assisting the Government to produce detailed, largescale land classification maps for each of the five administrative Divisions of the country. It is believed that the Divisional basis for these maps is more appropriate in the Gambian context for land use planning since all government service systems are geared to Divisional organizational structures. In production of these maps, priority should be given to MacCarthy Island Division and Upper River Divsion during the first year of the project. These two divisions constitute the eastern half of The Gambia which is the zone of expansion for the Phase II RDP and the area of greatest livestock concentration, hence greatest grazing pressure. The AID contributions to this component are expected to be used for contractual agreements to supply: satellite and aerial imagery of the entire land surface of The Gambia; technical expertise in photo interpretation, ground verification and land classification; and the production of all maps. It is anticipated that this component will be completed in the first two years of the project.

2. <u>Grazing Areas Development and Management</u>

Using the results that will flow from the preceding project component, it is envisaged that this component will:

a. Provide assistance to the Government of The Gambia in developing a national land use planning capacity wihin the MANR which can relate to the problems of both cropland utilization and non-cropland.

b. Provide assistance in training change agents at all levels in grazing areas development and management.

c. Provide assistance to the Department of Animal Health and Production in planning and implementing a program of legislated, controlled grazing areas with the necessary stock access routes, watering points, firebreaks, forestry shelter belts, and stock-handling facilities.

With regard to the development of a national land use planning capacity, an excellent start is being made through the formation with AID assistance of a Soil and Water Management Unit within the MANR. This project proposes to build upon and support that Unit by supplying to the Ministry such technical assistance as will be necessary to formulate and implement an overall national land use plan. Particular attention in this project will be given to the management of fallow non-cropland. This technical assistance will include the long-term participation of a specialist in land use planning; the short-term assistance of an agricultural engineer(s) specialized in water development and livestock facilities and a legal expert in land use legislation; and assistance to a local cartography unit for production of necessary sub-Divisional-level maps for planning purposes.

The interventions envisaged for the training of change agents and communication with the rural population under this project are discussed in a following section on Agricultural Skill Training. It is anticipated that the forty-two Gambian Livestock Owners Associations, located one or two in each administrative District, will be the primary focus of and legal basis for the grazing areas management program. Present members of these co-operative organizations now control the majority of animal grazing units in the country and are principal users of the non-cropland resources.

The Ministry of Agriculture and Natural Resources has already started a process of articulating a national land use plan which includes among its elements the delineation of livestock access routes through existing croplands; the demarcation of traditional village grazing areas; the siting of essential well and surface water development points; and, where possible, the construction of drinking access points for livestock from the Gambia River above the saline interface zone. In addition, the Government intends to undertake essential actions in farmer education that will lead to a legislated limit on the amount of land use for crop cultivation, a reconsolidation of fields into more rational management units, and the institution of appropriate grazing control programs within the carrying capacities of the village grazing areas.

The AID inputs into this program, exclusive of the personnel enumerated above, are expected to be used for:

a. Physical demarcation of access routes and grazing areas.

b. Cartography of grazing areas and access routes on district and divisional levels.

c. Studies of vegetative cover composition, condition, and carrying capacity in village grazing areas.

d. Construction of 40-50 wells and surface water points and 20 access points to the river.

e. Implementation of a bush fire control program.

f. And, such forestry interventions which are not to be covered by the anticipated CILSS/AID forestry and revegetation project for The Gambia and which logically relate directly to grazing areas improvement and management.

3. <u>Improved Crop and Forage Management</u>

In The Gambia, croplands and fallow are exploited solely in relation to the foodgrain and cash crops they produce. This has three critical consequences for land resource management:

a. Crop rotations do not provide a basis for replenishment of vital nutrients and organic matter; thus, soil fertility declines and resource degradation occurs.

b. Such crop residues as are available from current cultivation practices are poorly handled and therefore do not have much utility for either livestock feed or other purposes like soil protection. This accentuates the soil degradation and puts added grazing pressure on the already overexploited permanent pastures.

c. Fallow land is simply left to a natural but lengthy process of natural revegetation which is increasingly ineffective due to growing land pressure.

To ameliorate this situation and as a complement to the grazing areas effort, the component provides for several pilot actions in collaboration with the Soil and Water Management Unit of the MANR. They are:

1. A pilot program to introduce maize for food and forage and legumes for forage into the present crop rotation for selected farmer groups.

2. A pilot program for the Livestock Owners Association in forage production on fallow land.

3. An extension effort in proper management and utilization of crop residues and available natural vegetation for livestock feed and cropland protection.

The AID inputs for this component will include technical assistance in the person of one American agronomist for the life of the project; short-term technical consultancies in maize and forage production under tropical conditions; and necessary production inputs; e.g., improved seeds, fertilizer, fencing materials.

4. Improved Rural Technology

One of the major areas of integration of crop and livestock enterprises in The Gambia is in the provision of animal power for farm activities. There are two elements involved:

a. Animal traction equipment for direct cropping activities.

b. Animal power for farm transport of agricultural inputs and outputs.

The IBRD/RDP covers the first element for the western half of The Gambia at present and animal traction equipment is included in the crop packages of the project. The second element was also included to a lesser extent in the first phase of the RDP. Experience during initial implementation of the RDP has shown, however, that the farmer demand for animal-drawn farm carts has far exceeded the anticipated level and credit funds made available through the Department of Cooperation of the Ministry of Agriculture and Natural Resources have been quickly expended. In discussions with IBRD officials in January 1978, it was proposed that AID collaborate directly with the RDP by assuming major responsibility for the provision of multi-purpose farm carts under our proposed project, while the Phase II RDP concentrates on provision of animal traction equipment.

AID inputs under this component would be in the provision of funds for purchase of farm carts through the Cooperative Societies administered through the Department of Cooperation. These cooperatives serve most farmers of The Gambia and already handle most of the agricultural credit available to the rural sector. In addition to the establishment of the credit fund, AID would supply the short-term technical assistance of an agricultural credit specialist on an annual basis for training of cooperative officials and evaluation of the credit program.

5. Demonstration Enterprise Program

A central premise maintained throughout this project proposal is that improvement of the capacity to manage land resources in The Gambia is contingent upon increasing the productivity of farm enterprises. Enterprises that are based on extensive land use in

the country that faces a serious land availability constraint are simply no longer compatible with maintenance of an acceptable standard of rural life. The IBRD/RDP is attempting to introduce crop technology packages for all major crops except maize. A pilot program for this crop will be mounted under this project. It is hoped that one output of these efforts will be greater crop productivity on a smaller land surface that was possible in the past.

When one looks at livestock enterprises, it is evident that real economic progress is dependent on two fundamental actions at the producer level in The Gambia. The first, as set forth above, is land use planning and the controlled grazing of livestock within the limits of the country's total carrying capacity. The second is increasing the economic productivity of those individual animals maintained by livestock owners. It is felt that neither of these actions mounted independently will promote sustained economic growth or effective resource management. They must proceed in concert.

An important corollary flowing from the above premise is that to be effective, the proposed project must of necessity deal with all major classes of ruminant livestock in the country. These include goats, sheep, and cattle. Lesser attention will be paid to poultry, swine, horses, and donkeys.

Livestock production interventions will be formulated in detail at the Project Paper stage of project design. The intention is to devise and introduce at the level of the selected Livestock Owners Associations certain pilot actions in improved animal husbandry which, when tested and evaluated, can be made generally available to all farmers through a collaborative effort between the Departments of Animal Health and Production and the Department of Cooperation. Among the pilot actions to be undertaken during the project are:

1. Improved husbandry for lactating ruminant females and their young.

2. Improved herd/flock management in breeding stock selection, culling, castration, and age-group herding.

3. Short-cycle group fattening projects for sheep and cattle.

4. Communal herding of sheep and goats.

5. Establishment of commercial poultry flocks in periurban areas for egg production and improvement of poultry flock in village areas for meat production.

6. Improved sanitary handling and processing of rural milk supplies.

7. Improved husbandry and training programs for work animals.

USAID inputs into this project component are expected to be long-term technical assistance as one animal husbandry specialist; short-term assistance of a feeds specialist; commodities and equipment assistance in the selected testing of the production interventions; and production credit for those interventions proven feasible for widespread adoption. The production credit element will be for short-term commodity credit and will be administered through the Cooperative Societies. Credit will be available to all farmers in The Gambia who wish to participate and qualify under the regulations of the cooperatives.

Also under this component of the project, assistance will be given to the Department of Animal Health and Production to institute and maintain comprehensive health coverage to all classes of livestock in The Gambia of animal health and production. This is to be done through direct supply of commodities, transport, and equipment to the Department at the national and divisional levels and indirect supply of commodities and equipment to the Livestock Owners Associations at the district and sub-district levels.

The objectives of this assistance are:

1. To increase the capacity of the Department to execute its annual national campaigns against major animal diseases - e.g., rinderpest, contagious bovine pleuropneumonia, small ruminant pest - and to provide other veterinary services from its five divisional stations and their sub-stations;

2. To assist the Livestock Owners Associations in developing a capacity among members to administer simple routine animal health care treatments without veterinary assistance;

3. To remove effectively routine diseases and parasites as a major wide-spread constraint on the productivity of livestock in The Gambia and thereby support complementary actions in feeding, husbandry, and resource management directed toward maximizing the productivity of the individual animals.

The main assistance through the Department will be in control of rinderpest, CBPP, haemorrhagic septicaemica, black leg, anthrax, and small ruminant pest through timely vaccination and in provision of regular treatments against trypanosomiasis in high tsetse challenge areas.

The members of the Livestock Owners Associations will receive training in the routine administration of anti-helmintic medications for ruminants, use of sprays for ectoparasite control on all animals, curative treatments for minor wounds and associated health problems, and methods of bloodless castration. After training has been completed, commodities and equipment will be supplied through the Associations to foster continuous producer-level health care of livestock.

It is anticipated that the Government will supply all necessary vaccines for the Department through existing national level procurement mechanisms and all personnel necessary for health program implementation. AID assistance at this level will be limited to supply of essential commodities, transport, and equipment in the first year of the five-year project.

Assistance to Livestock Owners Associations for animal health treatments will be predicated on the adoption of a system for producer payment at economic cost for all commodities supplied under the program after the fourth year of project operation. Trypanocidal drugs will also be supplied under Department administration with full economic cost being borne by producers after the fourth year of project operation. Procedures for the administration of a revolving fund created by producer payments for services and commodities will be devised during the project design process so that all animal health interventions, with the sole exception of nationwide endemic disease vaccinations, will be wholly producer-supported by the end of the project.

6. Strengthening Ministry Planning and Evaluation Capacity

A unit will be formed at the project's outset within the Ministry of Agriculture and Natural Resources and under the direction of the Permanent Secretary for purposes of planning, implementing and evaluating all project interventions. This socio-economic unit will have five major functions. They will be:

1. To conduct initial baseline studies prior to the start of major project activities so as to provide a firm basis for evaluation of project impact during implementation.

2. To assemble and synthesize all available technical economic and social information necessary to plan and implement specific project interventions.

3. To serve as the internal coordinating office for all project activities and participate in the Ministry Planning Unit and Ministry Project Coordinating Committee meetings so as to insure maximum and continuous communication and coordination among agencies of the Ministry and with all external donor agencies.

4. To provide for continuing field evaluation of project interventions in collaboration with government agencies and the Gambian Livestock Owners Associations.

5. To assist in the training of local specialists in these tasks so as to institutionalize the functions of effective research, planning and evaluation within the Ministry.

USAID inputs into this unit will be in the form of long-term technical assistance of the USAID project manager and an agricultural economist; short-term specialists in social analysis, statistical sampling techniques, and data processing; and sufficient funding to conduct necessary field research and evaluation of data collected.

Initial project activities to be carried out by this unit are a major socio-economic study of farm production units from a selected sample of farms having both crop and livestock enterprises; and two successive livestock censuses during 1979 and 1980 to establish accurate baseline data on the major utilizers of fallow and non-cropland in The Gambia.

7. Agriculture Skills Training and Communications

The transfer of technical information between the Ministry of Animal and Natural Resources (MANR) and the rural population of The Gambia has traditionally been a function of the extension services of the various departments. The Extension Aids Unit, previously attached to the Department of Agriculture, will shortly become an autonomous agency within the Office of the Minister.

While the IBRD/IDA RDP project and other external donor assistance is effectively dealing with agricultural training as it relates to crop husbandry, skill training in complementary skills related to resource management and animal husbandry has been largely ad hoc and heretofore limited to the field of animal health.

Services provided to livestock owners were essentially limited to innoculation campaigns until recently when efforts to establish a livestock extension service were undertaken, and a series of radio broadcasts in local languages were addressed to

farmers on the subject of animal production. These broadcasts were followed by a successful campaign to organize animal producers into Livestock Owners' Associations (LOA's) which represent an attempt on the part of farmers who are also animal owners collectively to identify and solve problems that could not be resolved as a result of individual initiatives. The inputs of this project consist of a series of technical, infrastructural, and training interventions that are designed to alleviate the problems of Gambian farmers as they themselves have expressed them.

The ultimate success of the project will depend upon the extent to which access to project interventions are provided to the maximum number of present and potential farmer livestock owners.

The training and communications component of this project arises from a need to engage effectively the active participation of the rural farmer in the utilization of improved techniques and services that will be made available to him within the scope of the project. The key social structure through which project interventions will ultimately flow is the Livestock Owners' Association (LOA). It is appropriate, therefore, that support, information, training, and feedback systems involve the LOA's to the greatest extent possible.

The training element of this project has three key components:

a. Direct farmer-level training;

b. Training and re-training of MANR Department of Animal Health and Production personnel; and

c. Development of appropriate systems for training materials development, evaluation, and feedback.

Direct farmer-level training in animal health and production.

The substantive nature of the training offered will be developed by the training and information unit of the Department of Animal Health and Production as a direct outflow of the specific

technical and infrastructural interventions herein described, combined with ongoing services provided by the Government. Farmer-level training will be effected via several principal avenues:

1. Through existing social organizations.

2. Through the use of training centers for village leader practical training seminars.

3. Through on-site village livestock extension services.

4. Through mass communication via existing and proposed media with on-site reinforcement.

In brief, existing social organizations such as Livestock Owners' Associations, Young Farmers' Clubs, Kafos (village age-groups), women's societies and village development committees will each be visited by Livestock Inspectors and/or Livestock Assistants on a regular basis. The change agents will have a variety of resources at their disposal including the physical facilities of the Mixed Farming Centers and Livestock Training Centers, the mobile audio-vidual vans of the Extension Aids Unit, radio re-inforcement and access to videotape apparatus. Appropriate instructional materials will be developed by the training and information unit of the Department of Animal Health and Production. Although the primary social organization for upgrading via extension will be the Livestock Owners' Associations, it is recognized that the inclusion of the other social organizations will broaden the base of the beneficiary population that gains access to proposed project intervencions.

Two Livestock Training Centers will be constructed and/or renovated within this project: one at Wuli Farm in the East, and one at Yoroberikunda (YBK) in the center of the country.

In addition, the facilities of the 24 Mixed Farming Centers (MFC's) will be shared by the livestock service. A certificate-level Livestock Assistant will be assigned to each of the centers and will organize and conduct short-term farmer-level

training programs addressed to each of the key themes of the project, involving farmer leaders, herdsmen, and representatives of other social organizations. The precise nature of the training center program will be determined by the training and information unit of the Department of Animal Health and Production and Coordinated with the Departments of Agriculture and Cooperation.

To the extent possible, Livestock Inspectors will be assigned to major village groupings to provide on-site services in techniques of animal husbandry and resource management. These Inspectors, all under the supervision of Livestock Assistants, will be the principal mechanism through which access to government services is explained to Livestock owners. The Inspectors will also provide periodic feedback to the Ministry as to the impact of specific interventions and the need for modification or review.

The availability of government services and information relating to improved resource management and livestock activities will be communicated to farmers via regular radio broadcasting, cinema vans, graphics, and video-tape apparatus. The Extension Aids Unit will implement these presentations with the active collaboration of the Training and Information Unit of the Department of Animal Health and Production. Structured radio and audio-visual programming will receive on-site reinforcement and elaboration through village demonstrations by Livestock Inspectors.

<u>The Training and Re-training of Department of Animal Health and Production Personnel</u>.

These personnel can be placed in three broad categories:

1. Livestock Officers

2. Livestock Inspectors

3. Livestock Assistants

There are approximately 130 slots for Livestock Inspectors in The Gambia, most of whom have received little or no formal training. What little training they have received to date has been, mainly, on-the-job and concerned with the administration of drugs and the use of simple equipment. It is proposed that all training and retraining of Inspectors be done locally at Livestock Training Centers (Wuli Farm in Upper River Division, YBK in McCarthy Island Division and, eventually, at Yundum in Western Division). The proposed course of training will last nine months. It will be one-half theory and one-half practical, using locally prepared syllabi that seek to achieve a more comprehensive familiarity with the principles of resource management and livestock development combined with an understanding of the relationships between agricultural and livestock production. Short in-service training programs will be provided for Inspectors who are presently employed but have only on-the-job training.

The content of the training will include not only traditional veterinary subject matter (anatomy, physiology, animal care, parasitology and lab techniques), but animal production, marketing, the inter-relationships between crop and animal husbandry, pasture land management, and natural resource conservation. Formal and practical training will include communications, use of visual aids, radio and discussion group techniques.

In addition to the training of Inspectors, facilities for the training of Gambians in agricultural and animal by-product processing will be provided.

Effective 1978, the training of Livestock Assistants is done in The Gambia at existing centers and institutions. There are slots for approximately 60 Livestock Assistants in The Gambia most of whom will receive in-service re-training, in addition to the upgrading of five Inspectors to Assistant level per year over a five-year period.

Training of university-level professional personnel will need to be obtained externally. It is proposed that participant training be offered over the next five years, as per the following chart:

Entry Level	Degree Level/ Specialty	Student Number	Training Duration	Training Location	Training Start	Prospective Assignments
B.A.	M.S./Ag Econ.	2	2 years	U.S.	CY 79,81	Research/Evaluation Unit
B.A.	M.S./Statistics	2	2 years	U.S.	CY 79,81	Research/Evaluation Unit
B.S./ Vet.	M.S./Tropical Forages/Pastures	1	2 years	U.S.	CY 79	Animal Production Division
B.S./ Vet.	M.S./Land Use Planning	1	2 years	U.S.	CY 79	Animal Production Division
B.A.	M.S./Ag Credit & Cooperatives	1	2 years	U.S.	CY 80	Research/Evaluatin Unit
B.A.	M.S./Livestock Marketing	1	2 years	U.S.	CY 79	Livestock Marketing Board
B.A.	M.S./Education Technology	1	2 years	Africa	CY 79,80	Training/Information Unit & Extension Aids Unit
B.A.	M.S./Education Technology	1	2 years	U.S.	CY 79	Training/Information Unit
B.A.	M.S./Ag/Live-stock Education	1	2 years	U.S.	CY 79	Training/Information Unit
Certi-ficate	B.S./Graphics	1	1 year	Africa	CY 79	Training/Information Unit

Total Trainees = 13 Gambians Total Participant Years = 23 (U.S. = 20: Africa = 3)

As additional participant training needs are identified, they may be funded under existing regional participant training programs.

The Development of Appropriate Systems for Training Materials Development, Evaluation and Feedback.

A Training and Information Unit has recently been created within the Department of Animal Health and Production. The Unit is responsible for the preparation and reproduction of all locally used training materials, audio-visual materials, and radio broadcasts relating to livestock development.

The Training and Information Unit will eventually consist of the following personnel:

1. One Livestock Officer in Livestock Education (M.S.) (Projected Director)
2. One Education Techno Specialist (M.A.)
3. One Graphics Specialist (B.A.)
4. One Media Specialist (M.A.)
5. Two Information Assistants (Certificate).

As needed, technical staff will be assigned to work with the Training and Information Unit for the development of appropriate training curricula.

Three years of technical assistance will be provided to the Training and Information Unit to provide leadership and expertise in the development of appropriate instructional materials. This individual who should be an M.S. in Ag/Livestock Education with experience in educational technology will overlap with the Gambian Unit Director who will be trained in the U.S.

Facilities and equipment for the Training and Information Unit will be provided.

In order to assure that appropriate feed-back and evaluation of farmer training can be institutionalized within the Ministry of Agriculture, it is proposed that an appropriate U.S. research institute be contracted to work collaboratively with the Pan African Institute for Development of the Sahel

to develop systems regular to monitor and assess the apprpriateness and impact of Ministry training and communications program. It is anticipated that PAID will eventually gain sufficient experience and expertise in this field to develop similar systems among agricultural producer societies throughout the Sahel. Fifteen months of U.S. technical assistance (3 months per year) and 15 person months of PAID assistance would be provided. This activity will involve and strengthen the socio-economic unit previously described.

Anticipated Project Outputs

Upon completion of the project, the following outputs are expected:

1. Detailed, large-scale land use classification maps will have been prepared for the five administrative Divisions of The Gambia and appropriate expertise for the interpretation of satellite and aerial imagery will have been provided.

2. A National land use planning capability will have been created within the Ministry of Agriculture and Natural Resources which will have resulted in a sound program of legislated, controlled, grazing areas with necessary stock access routes, watering points, firebreaks, forestry shelter belts and stock handling facilities.

3. A functioning Training Information Division unit will be in place within the Department of Animal Health and Production. This unit will have prepared, reproduced and disseminated appropriate materials relating to mixed farming activities, and resource management.

4. Systems for feed-back, evaluation and reprogramming of agricultural training strategies will be in place. Procedures for the measurement of the impact of agricultural development activities will have been devised to assure on-going project evaluation.

5. Thirteen Gambians will have received mid-level or advanced participant training in specialties relating to mixed farming and agricultural support services.

6. Credit for the purchase of farm carts will have been provided to a significant number of rural farmers through the Gambian Department of Cooperation. As a result of the provision of farm carts, farmers will make increased use of animal power for the transport of agricultural inputs and outputs, which will in turn generate higher agricultural and animal productivity.

7. Pilot progras for the introduction of maize for food and forage and legumes for forage will have been thoroughly tested and proven viable under local farming conditions.

8. Pilot programs for the use of fallow land for forage production will have been introduced.

9. A series of pilot actions dealing with improved husbandry practices for poultry, small ruminants and cattle will have been introduced. These and other pilot outputs will be quantified in the project paper.

10. Systems for effective animal disease prevention and control will be institutionalized at all levels, with emphasis upon the development of village level self-help execution of routine animal health care.

11. Each of the Livestock Owners Associations will have tripled their membership, including women, and will serve as effective candits for the training of farmers.

12. At least 50% of the households in rural Gambia will have received either formal or informal training in animal husbandry as it relates to crop activities. At least 200,000 people will be dir3ctly affected.

13. Two centers for training in livestock and resource management activities will have been constructed and will be 75% utilized for the in-service upgrading of 130 livestock inspectors and direct training of farmer leaders. The training curriculum will be revised to reflect new emphases upon mixed farming and land resource management.

14. Each Livestock Owners Association will be assigned the services of a fully qualified Livestock Inspector.

15. Farmers will have received regular expose to audio-visual demonstrations supported by extension follow-up.

16. Each Mixed Farming Center will receive the services of a qualified Livestock Assistant, whose primary role will be to integrate animal husbandry with existing programs in crop husbandry.

II. RELATIONSHIP OF THE PROPOSED PROJECT TO AID COUNTRY STRATEGY AND HOST COUNTRY PRIORITIES.

This issue was dealt with in the first section of this paper as an integral part of the project description. All components of the proposed project flow logically from Gambian Government priorities, complement other donor activities, and respond to the AID country strategy as articulated in the Development Assistance Paper of November 1976.

III. AID POLICY ISSUES

a. Project Beneficiaries Statement

Since over eight percent of Gambian households are directly engaged in crop and animal enterprises on farms and the remainder of the population is heavily dependent on the development of rural sector for economic progress, this project will benefit the entire population of the country either directly or indirectly. Furthermore, since the growth and development of rural service institutions - particularly the Livestock Owners Associations, the Agricultural Cooperatives, and the rural training centers - is an explicit component of the project structure, broader access to project interventions and government services will be available to the poorest of the farmers. Since credit will be channeled through the existing Agricultural Co-operatives, of which virtually all Gambian farmers are members, and since credit will be directed toward the support of a broad range of agricultural and livestock enterprises, the poorer

segment of the population will derive the greatest benefit. Finally, since this project addresses problems related to the management, protection and conservation of the renewable resource base of the country, it will ultimately benefit the entire population.

b. Human Rights Issues

There are no known human rights issues vis-a-vis The Gambia that would affect in any way the development of this project.

c. Women in Development Issues

Women in The Gambia will benefit directly from project activities aimed at increased maize production, improved husbandry techniques for small ruminants and poultry, and better sanitation in handling of rural milk supplies, which are considered primarily women's activities. They will also share equally in the benefits to be derived from improved land resource management and agricultural training.

d. Initial Environmental Assessment

It is recommended that prior to or in conjunction with the development of the Project Paper, an initial environmental assessment be conducted by a competent professional in the field.

IV. PROJECT FINANCIAL REQUIREMENT AND PLAN

The financial requirements for this proposed project are detailed in the attached tables. The best estimate of project costs for FY 78 pre-project, FY 79 and life of the project funding are shown therein. Total cost is estimated at US $ This will be grant funding under the CILSS/ USAID Sahelian Development Program Phase One project generation exercise. Interventions under this project will be planned so that most are self-supporting by the end of the first five years.

Although a full costing of the proposed Gambian inputs into the project has not been conducted to date, it is fully anticipated that host country contributions in cash or kind will approach or exceed 25% of the total USAID project funding.

V. PLAN FOR THE DEVELOPMENT OF THIS PROJECT

It is projected that the present PID will be approved in AID/Washington not later than early April 1978. If this action is taken, it is recommended that work in The Gambia on the Project Paper commence not later than 15 May 1978 so as to complete the project design by 15 July 1978 and the final project reviews by 1 September 1978.

Personnel needed for the completion of the Project Paper are as follows:

	Specialist	Source	Time Required
1.	Land Use Planner/Resource Management	Contract	6 weeks
2.	Animal Husbandry Specialist	Contract	4 weeks
3.	Agronomist/Maize and Tropical Forages	Contract	4 weeks
4.	Livestock Economist/Design Officer	REDSO/WA	6 weeks
5.	Anthropologist/Rural Sociologist	REDSO or Contract	4 weeks
6.	Training and Communications Specialists (two)	Contract - US and P.A.I.D.	4 weeks
7.	Civil/Agricultural Engineer	REDSO/WA	2 weeks
8.	Cooperatives and Credit Specialist	Gambia	6 weeks
9.	Animal Health/Veterinarian	Gambia	6 weeks

Estimated cost of the contract services for project design is US $58,500 for six and one half person months of assistance. Pre-project funding for two studies should be considered by the Project Paper team. These are the initial environmental assessment in Section III. D. above and any necessary follow-up studies; and an advanced start on the socioeconomic studies proposed in Section 1 d.6. including a national livestock census in late 1978 and the farm management/sociological study to obtain project baseline data.

VI. ISSUES OF A PROGRAMMATIC NATURE

1. A thorough economic analysis must be conducted on a component basis at the time of the Project Paper design to assure the economic viability of all project interventions.

2. The social and economic analyses in the Project Paper should be particularly careful with respect to questions of equity and spread effect of all project interventions.

3. Organizational structure and capacity of key government and private agencies involved in the implementation of this project should be assessed and responsibilities specified at the time of the Project Paper design.

4. Project interventions that are of specific and direct benefit to rural women should be separately detailed in the Project Paper.

5. Further necessary study of environmental issues related to this project should be fully enumerated in the Project Paper.

6. The extent and nature of active collaboration with other external donor agencies in the implementation of this project must be fully detailed in the Project Paper.

7. The issue of funding specific project interventions through direct project budgeting or through other existing or planned AID projects must be resolved at the final design exercise. This relates specifically to the funding the land classification and cartogrphy component under the Gambia River Basin Study and/or agricultural skills training overseas under either the African Manpower Development Program or the S.S.I.C. project currently under design in AID/Washington.

ESTIMATED PROJECT FINANCIAL REQUIREMENTS BY COMPONENTS

	PROJECT COMPONENT	PRE-PROJECT COSTS	FY 1979 COSTS	LIFE OF PROJECT COSTS
1.	Land Resource and Use Evaluation Classification and Cartography	$ ---	$ 200,000	$ 525,000
2.	Grazing Areas Development and Management	55,000	420,000	1,970,000
3.	Improved Crop and Forage Management	---	185,000	940,000
4.	Improved Rural Technology	---	87,000	395,000
5.	Demonstration Enterprise Program	55,000	420,000	2,410,000
6.	Strengthening Ministry Planning and Evaluation Capacity	330,000	240,000	1,215,000
7.	Agricultural Skills Training and Communications	55,000	516,000	2,670,000
	GRAND TOTALS	495,000	$2,068,000	10,125,000

1. Component: LAND RESOURCE AND USE EVALUATION. CLASSIFICATION AND CARTOGRAPHY

Functional Category	Pre-project	FY 1979	Life of Project
Construction	--	--	--
Technician housing	--	--	--
Equipment/Commodities	--	$ 50,000	$125,000
Participant Training	--	--	--
Technical Assistance (long term)	--	--	--
Technical Assistance: Contract for Professional Services	--	$ 75,000	$225,000
Vehicles/Transportation	--	$ 25,000	$ 25,000
Field research studies	--	$ 50,000	$150,000
Services	--	--	--
Production Credit	--	--	--
Grazing areas infrastructure	--	--	--
TOTALS		$200,000	$525,000

2. Component: GRAZING AREAS DEVELOPMENT AND MANAGEMENT

Functional Category	Pre-Project	FY 1979	Life of Project
Construction	--	--	--
Technician housing	$ 55,000	--	$ 55,000
Equipment/Commodities	--	$ 25,000	$ 50,000
Participant Training	--	--	--
Technical Assistance (long term)	--	$ 80,000	$500,000
Technican Assistance (short term)	--	$ 40,000	$200,000
Vehicles/Transportation	--	$ 25,000	$ 40,000
Field research studies	--	$ 50,000	$150,000
Services	--	--	--
Production Credit	--	--	--
Grazing areas infrasture	--	$200,000	$1,970,000
TOTALS	$55,000	$420,000	$1,970,000

3. Component: IMPROVED CROP AND FORAGE MANAGEMENT

Functional Category	Pre-Project	FY 1979	Life of Project
Construction	--	--	--
Technician housing	--	$ 55,000	$ 55,000
Equipment/Commodities	--	$ 25,000	$ 75,000
Participant Training	--	--	--
Technical Assistance (long term)	--	$ 40,000	$360,000
Technical Assistance (short term)	--	$ 40,000	$160,000
Vehicles/Transportation	--	$ 25,000	$ 40,000
Field research studies	--	--	$ 50,000
Services	--	--	--
Production Credit	--	--	$200,000
Grazing areas infrastructure	--	--	--
TOTALS	--	$185,000	$940,000

4. Component: IMPROVED RURAL TECHNOLOGY

Functional Category	Pre-project	FY 1979	Life of Project
Construction	--	--	--
Technician housing	--	--	--
Equipment/Commodities	--	$ 2,000	$ 5,000
Participant Training	--	--	--
Technical Assistance (long term)	--	--	--
Technical Assistance (short term)	--	$30,000	$ 75,000
Vehicles/Transportation	--	--	--
Field research studies	--	$ 5,000	$ 15,000
Services	--	--	--
Production Credit	--	$ 50,000	$300,000
Grazing areas infrastructure	--	--	--
TOTALS		$ 87,000	$395,000

5. Component: DEMONSTRATION ENTERPRISE PROGRAM

Functional Category	Pre-project	FY 1979	Life of Projec
Construction	--	$ 20,000	$ 150,000
Technician housing	$ 55,000	--	$ 55,000
Equipment/Commodities	--	$250,000	$1,035,000
Participant Training	--	--	--
Technical Assistance (long term)	--	$ 60,000	$ 380,000
Technical Assistance (short term)	--	$ 20,000	$ 120,000
Vehicles/Transportation	--	$ 25,000	$ 70,000
Field research studies	--	--	--
Services	--	$ 20,000	$ 100,000
Production Credit	--	$ 25,000	$ 500,000
Grazing areas infrastructure	--	--	--
TOTALS	$ 55,000	$420,000	$2,410,000

6. Component: STRENGTHENING MINISTRY PLANNING AND EVALUATION CAPACITY

Functional Category	Pre-project	FY 1979	Life of Project
Construction	--	--	--
Technician housing	$55,000	--	$ 55,000
Equipment/Commodities	--	$ 25,000	$ 50,000
Participant Training	--	--	--
Technical Assistance (long term)	--	$ 80,000	$400,000
Technical Assistance (short term)		$ 30,000	$160,000
Vehicles/Transportation		$ 30,000	$ 50,000
Field research studies	$275,000[1)]	$ 75,000	$500,000
Services	--	--	--
Production Credit	--	--	--
Grazing areas infrastructure		--	--
TOTALS	$330,000	$240,000	$1,215,000

1) Includes national farm management study, socio-economic study of land conflic and livestock census.

7. Component: AGRICULTURAL SKILLS TRAINING AND COMMUNICATIONS

Functional Category	Pre-project	FY 1979	Life of Project
Construction	--	$260,000	$1,620,000
Technician housing	$55,000	--	$ 55,000
Equipment/Commodities	--	$115,000	$ 310,000
Participant Training	--	$ 50,000	$ 240,000
Technical Assistance (long term)	--	$ 40,000	$ 240,000
Technical Assistance (short term)	--	$ 36,000	$ 180,000
Vehicles/Transportation	--	$ 15,000	$ 25,000
Field research studies	--	--	
Services	--	--	
Production Credit	--	--	
Grazing areas infrastructure	--	--	
TOTALS	$55,00	$516,000	$2,670,000

COMMENTS ON PROJECT PROPOSAL FOR THE GAMBIA

TITLE: Gambia Mixed Farming and Resource Management

PROJECT NUMBER:

655-0203

OBJECTIVES:

Increase efficiency and productivity of the farm enterprises through better land resource planning and management. Improvements in animal husbandry, crop husbandry and crop rotation; training of farmers and agricultural support personnel; establishment of socio-economic planning and evaluation unit in the Ministry of Agriculture and Natural Resources.

COMPILATION OF COMMENTS:

Sources:

Dr. H.D. Norman, Kansas State University
Dr. G. Saker, CIPEA, Bamako
Dr. R.E. McDowell, Cornell University

Comments by Dr. Norman:

(1) These comments reflect my own feelings about the proposed Gambia mixed farming and resource management projects which were discussed with Dr. Thomas and Dr. Touray during the recent meeting in Bamako, Mali.

(2) There is no question that the proposal is well thought out and has received a great deal of effort in terms of putting together a coordinated project. In terms of the following comments, points 3 through 7 are of major consideration while the remaining ones are somewhat minor. In reading through the proposal there were a number of other questions which arose but these were resolved in the latter part of the project paper where there was indication they would be taken into account in drawing up the formal project proposal to be undertaken in May and June of 1978.

(3) I am somewhat concerned about the way in which improved technology is treated in the document. On Page 2 it is indicated that such technology is not available, while on Pages 8 and 9 it indicates there is technology available for testing and on Page 19 it indicates that proven technology will be tested and disseminated. The center piece of any proposed project on rural development must resolve around an income generating component. There is some doubt about the availability of viable technology. Obviously technology is available which is technically possible but it still has to be proved to be economically viable and acceptable to farmers. I would, therefore, like the planners to be a little more careful on how consideration of improved technology is phrased in the final proposal.

(4) I am concerned about the functions of the planning unit on Page 12. All the functions listed are important but I am afraid it will be impossible with the size of the planning unit to be able to undertake all of them satisfactorily. I have no constructive suggestions except that the potential weakness of this planning unit should be recognized. Also, another problem arises with respect to processing data. There is no computer available in The Gambia at the present time for undertaking processing and analysis of the data. This could be a key bottleneck and needs to receive serious consideration in the final document.

(5) There is no question that the role of cooperative and grazing associations seems to be well accepted in The Gambia. One major concern which admittedly lingers in spite of assurances to the contrary is the very important necessity of distinguishing between equality in terms of entry into such association and disparity in terms of the services received from such associations. This need to be carefully monitored and evaluated if the result is to be one of assuring that the poorest elements of the society benefit to a relatively greater extent from the proposed project.

(6) It seems to me that in the project proposal it is very important to specify the expected availability of counterparts involved in the project and also to outline in some detail the research capacity of The Gambia. The former obviously contributes directly to how much the foreign experts can receive in terms of support in undertaking the project, while the latter is very important in obtaining some idea as to the present availability of improved technology and also the development of further technologies.

(7) There is to mind perhaps too much emphasis on the short term communication and training component. I recognize this is important because livestock training has never received much emphasis in The Gambia. However, I do believe this training and communication needs to be looked through more carefully than it has to date. At the moment a number of different approaches are suggested and it would seem to me that some choices have to be made as to the most relevant strategies. Also, to my mind there is too much involved in terms of a budget for training and communication section, but admittedly a subjective bias creeps into my feeling on this point. It relates fundamentally back to point number 3 above where I am concerned about the lack of availability of proven technologies which will be adopted by farmers.

(8) In the document it mentions the possibility of introducing maize. I feel it would be necessary in the final proposal to indicate the necessity of providing maize mills and to mention the proposed marketing system that is under consideration by The Gambia government with respect to this crop. Both these factors have shown to be extremely critical elements in the adoption of maize by farmers in other parts of West Africa.

(9) In the document considerable emphasis is placed on the use of forage crops. As yet, I know of no case in West Africa where forage crops are grown by farmers for animal feeding. One possibility to investigate is that of a cereal forage mixture, for example, millet and cowpeas. This approach is used by farmers certainly in many other parts of West Africa where the cereal is grown for human consumption and the cowpeas for forage purposes. This dual purpose might make such an approach more acceptable to farmers but

one would, in this case, be in effect developing improved cowpeas varieties that produce a lot of forage rather than seed yield. Also, the problem comes with respect to the fallow land. If a system can be used which simply involves broadcasting seed before the rainy season commences, there may be some possibility of getting farmers to adopt such a system; however, if growing forage on fallow land involves much activity during the rainy season, such activities will clash directly with farming activities that have already been undertaken. Thus, it would appear unlikely that they will be willing to adopt such technologies. Once again, this refers to point 3 mentioned above.

(10) I personally would change the headings of the development of rural technology on Page 9 and the demonstration enterprise program on Page 10. I think the former could be headed "Technology for Integrating Livestock and Agriculture", while the latter could be more usefully identified as "Testing and Demonstration of Improved Technology".

(11) UNDP/FAO and RDP programs have some planing capacity. It will be very important in developing the work program of the planning unit for the proposed project to take into account the work undertaken in these other programs. Obvously duplications should be avoided.

(12) On Page 12 there is a rather deprecating statement about the inability of crop rotations to maintain fertility. Perhaps what it really meant is the inability of traditional crop rotations to maintain soil fertility.

(13) Where on Page 9 and 11 there is mentioned the role of animal scientists and agronomists in developing and testing relevant technology, I think it would also be very valid to mention an economist. Admittedly this is mentioned on the section on the planning unit; however, I think the role of multidisciplinary teams should be emphasized at every possible point. There is a danger that the economist might not be involved until the technology is developed; therefore, as such he simply plays an ex-post role which could appear to be construed as being destructive in terms of criticism. It is important that he be involved during the development stages as well.

(14) I believe in the training program for Gambians it would be important to submit a rural sociologist for training in order to insure that he relates properly to technical people. It would be advisable for him to work in the field situation for some time before proceeding elsewhere for graduate work. The two institutions that would appear to me to be the most suitable for providing the type of training that would be relevant to the project are the University of Wagenangen in Holland and Cornell University of the U.S.

(15) Also in reference to the training program it transpired during our discussion that there was a mistake in terms of the omission of Gambia animal scientists. In fact, two individuals slated for MS/Statistics training should be considered to be animal scientists. This appears on Page 17 of the proposal.

(16) On Page 21 it indicates that the poor will derive greatest benefits from the project. This may be a rather sweeping statement since there is no assurance that this will take place as far as I can see in the document. It has, in fact to be a major focus of the project. The project will need to be monitored during its implementation to permit modification of strategy in order to insure this takes place.

(17) As I stated before, I believe this is intrinsically a good project and certainly in terms of the project submitted at the meeting in Bamako, I think it was one of the best.

<u>Comments by Dr. Saker</u>:

(1) I recommend the project authors consider whether or not the land use in Gambia is a static situation or will there be expectancies of expansion into other lands. Seemingly, this point needs at least a mention in the project in order that planners not involved directly in the project will be aware of scope of activities.

(2) More ought to be said in the project about the land tenure system. Evidently land belongs in some cases to family units. The government has ultimate control. Often land use for assignment is for only one year duration Is not this feature something that ought to be given attention in the project because such short periods of tenure are not conducive to improvement of fertility and ecological balance. Evidently a family can sell refractory rights. Most of the allocations are made by council that may or may not be acting in the best interest of total program plans. Seemingly, some attention ought to be given to a land use planning policy that could relate to existing systems with the hope that changes might come about.

(3) Another question I feel the program planners should consider in developing the proposal is to make some mention of what is the fuel policy in the country. If there is a shortage of wood, will the fuel situation affect the farming situation approach proposed? Is fallow brush important to fuel supply, because this could be a very significant feature in execution of certain phases.

(4) There is an existing conflict evidently between crop farmers and herders. The point is raised because if the projected policies increase the risks of these conflicts it could be very serious, especially in a small country like The Gambia. It is, therefore, recommended the planners at least keep this aspect in mind.

(5) I concur with Dr. Norman in that The Gambia proposal is one of the best that was submitted at the Bamako conference. It has many good features and it also offers an interesting media in which to work because of the small size of the country and uniformity of conditions as compared to many other countries of the West African region. I, therefore, endorse the project and would be glad to offer informally any suggestions that the planners might consider helpful.

Comments by R.E. McDowell:

(1) I agree with the two other reviewers in that I think the project is a good one and from a livestock technician standpoint it has a great deal of appeal because it gives us an opportunity of learning more about the current technology used on small farms relative to handling and feeding of livestock versus what might be points of intervention that could improve the contribution by livestock.

(2) In our discussions the question was raised about the main route of contact with farmers being through the Livestock Association. To the outsider this might appear to be a biased sample if the intent is to help farmers in general. Seemingly, the project ought to have more explanation about participants in the Livestockmens' Association. Mentioned should also be made of the possibility of working with other organizations, such as the Groundnut Marketing Association.

(3) Currently Gambia has very limited personnel resources trained in what is termed in the Western hemisphere "animal husbandry". They have a number of people with veterinary training but usually the training for this group does not encompass sufficient experience to cope with total production systems on farms; hence, the general feeling is that more attention should be given to training a cadre of Gambians in animal nutrition and other aspects of husbandry. This is extremely important as existing technology for animal feed production and cropping patterns must be evaluated under local conditions. This is not intended to support building of a large research organization but technicians must be adequately trained to conduct "farm demonstration" testing in order to develop appropriate packages of practices for implementation.

(4) To make the proposed program effective in bringing about change in agriculture, there will need to be a base location from whence expatriot technicians and their local counterparts can do some preliminary testing, such as, plot testing for the suitability of certain grasses and legumes for the soil and farming systems that might be employed in Gambia. It would be premature to introduce

technology directly to farmers without at least some preliminary information on the broad feasibility of it being viable technology. Such a government farm exists near Banjul, a part of which would serve for use in small plot testing.

General Recommendations:

(1) This project is considered viable and the developers are encouraged to proceed toward solicitation of donor support.

(2) In preparation of the final project proposal, several of the points outlined above should be at least incorporated in order that people unfamiliar with The Gambia can appreciate the local conditions.

(3) It is strongly recommended that the Interdepartmental Planning Unit of the Ministry and Project Coordinating Committee carefully review the proposal and the comments because in the eyes of the reviewers the proposal imposes a great deal of responsibility onto these groups.

(4) The individual reviewers will gladly elaborate on their specific comments if this becomes desirable.

Report Prepared By:

R.E. McDowell
April 14, 1978

ANNEX Q.

PRELIMINARY INDICATION OF NEED FOR PEACE CORPS VOLUNTEERS

OPTIONAL FORM NO. 1
JULY 1973 EDITION
GSA FPMR (41 CFR) 101-11.6

UNITED STATES GOVERNMENT

Memorandum

TO : Yvonne Jackson, Peace Corps Director/Banjul **DATE:** July 5, 1978

FROM : AID Design Team Gambia Mixed Farming and Resource Management Project

SUBJECT: Preliminary Indication of Need for Peace Corps Volunteer Collaboration with AID Technicians in Support of The Gambia Mixed Farming and Resource Management Project

On June 19, 1978 you met with our planning team to brief us on Peace Corps activities in The Gambia and to hear our preliminary ideas about how PCVs could add valuable inputs into the livestock and agriculture support program we are hopeful AID/Washington will begin funding in the Fall of 1979. We realize that your own planning of PCVs follows a two stage process where you submit tentative and then final requests 9 and 6 months prior to service. We also admit we cannot confirm our proposals for the skill areas which appear on the following pages until Washington gives approval to the project. At any rate it is much better to plan in the longer range. The kind of collaboration we foresee will hopefully satisfy Washington's recently expressed concern for more effective AID/PC teamwork.

According to the team's current thinking, we would like to see thirteen Peace Corps Volunteer positions filled for a total of 48 person/years from 1979 to 1984. These positions would mainly be up-country, and would be attached to programs of the Departments of Animal Health and Production or Agriculture. In addition the positions would involve close collaboration with Gambian extension agents or Ministry support staff. In most cases long-term AID technicians would be available to direct the Volunteer's professional input.

In order to provide you with minimal necessary information at this stage, I have organized the position descriptions along the following lines:

a. Field
b. Degree prerequisites
c. Tentative dates of service
d. Possible number of person/years
e. Gambia Government institution to which the PCV would be attached
f. Where the PCV would be posted
g. Duties or tasks
h. Collaborators
i. Supervisors

5010-110

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In addition to this information, we also as a team would like to heartily endorse your offer to run an orientation workshop for the long-term team which might arrive in late 1979.

We thank you for considering these requests and AID/Banjul will certainly be in touch with you as the planning process evolves concerning this project. Again we appreciate this opportunity to collaborate.

Attachment a/s

Requested Peace Corps Volunteers

1. a. Forage agronomy
   b. B.S. in Agronomy or Animal Science
   c. July 1980-July 1984
   d. Four person/years
   e. Department of Animal Health and Production, Ministry of Agriculture and Natural Resources
   f. Up-country at a Mixed Farming Center
   g. Perform studies on groundnut hay as feed supplement for livestock
   h. Working closely with the agricultural and livestock extension agents working in the Mixed Farming Center
   i. Working under the supervision of the U.S. forage agronomist based at Abuko

2. a. Forage agronomy
   b. B.S. in Agronomy or Animal Science
   c. July 1980-July 1984
   d. Four person/years
   e. Department of Animal Health and Production, Ministry of Agriculture and Natural Resources
   f. Up-country, at a (different from above) MFC
   g. Perform on-farm testing of stylosanthes and other legumes in fallow rotations
   h. Working closely with the agricultural and livestock extension agents working in the Mixed Farming Center
   i. Working under the supervision of the U.S. forage agronomist based at Abuko

3. a. Forage agronomy
   b. B.S. in Agronomy or Animal Science
   c. July 1980-July 1984
   d. Four person/years
   e. Department of Animal Health and Production, Ministry of Agriculture and Natural Resources
   f. Up-country, in a village where there is a Livestock Owners' Association
   g. Evaluate trials of traditional and improved vegetation for animal feed
   h. Working with nearby livestock and agricultural extension workers
   i. Working under the supervision of the U.S. forage agronomist based at Abuko

4. a. Agriculture
   b. B.S. in Agriculture
   c. July 1980-July 1982
   d. Two person/years
   e. Department of Animal Health and Production, Ministry of Agriculture and Natural Resources
   f. YBK, the up-country animal production research and training center
   g. In the farm cart program to set up demonstrations of hauling and handling hay and manure of Livestock Owners' Associations
   h. Working in a two-person PCV team with a social scientist, in close collaboration with staff and trainees at YBK
   i. Working under the U.S. animal nutritionist at Abuko

5. a. Social science research
   b. B.A. in Rural Sociology
   c. July 1980-July 1982
   d. Two person/years
   e. Project Socio-economic Unit, Ministry of Agriculture and Natural Resources
   f. YBK
   g. Perform series of research studies relevant to the farm cart program such as:

      1. Studying farmer attitudes and receptivity
      2. Gather data on cart effectiveness

   h. Working in a two-person PCV team with an agriculturalist, in close collaboration with staff and trainees at YBK
   i. Working as a data collector and analyst for the socio-economic unit within the Ministry

6. a. Animal nutrition
   b. B.S. in Agriculture or Animal Science
   c. July 1980-July 1984
   d. Four person/years
   e. Department of Animal Health and Production, Ministry of Agriculture and Natural Resources
   f. YBK area
   g. Introduce cattle and sheep fattening schemes in Livestock Owners' Associations
   h. Working with YBK staff, trainees, livestock assistants in the field as well as in a two-person PCV team with a social scientist
   i. Working under the direction of the U.S. animal nutritionist at Abuko

7. a. Social science research
   b. B.A. in Rural Sociology or Agricultural Economics
   c. July 1980-July 1984
   d. Four person/years
   e. Project Socio-economic Unit, Ministry of Agriculture and Natural Resources
   f. YBK area (with PCV team member)
   g. Perform research studies relative to the sheep fattening program, such as:

      1. Livestock owners' attitudes
      2. Effectiveness data on sheep fattening

   h. Working in a two-person PCV team, with an animal nutritionist, and in close collaboration with the YBK staff as trainees, and livestock assistants
   i. Working as a data collector for the socio-economic unit within the Ministry of Agriculture and Natural Resources

8. a. Research and training in animal nutrition
   b. B.S. in Agriculture or Animal Husbandry
   c. July 1979-July 1983
   d. Four person/years
   e. Department of Animal Health and Production, Ministry of Agriculture and Natural Resources
   f. Yundum/Abuko
   g. 1. Supervise data collection of trials
      2. Collect field samples for laboratory evaluation
      3. Help trainee livestock assistants and inspectors through demonstrations and refresher courses
   h. The PCV will have a counterpart at YBK
   i. Working under the U.S. animal nutritionist at Abuko

9. a. Research and training in animal nutrition
   b. B.S. in Agriculture or Animal Science
   c. July 1979-July 1983
   d. Four person/years
   e. Department of Animal Health and Production, Ministry of Agriculture and Natural Resources
   f. YBK
   g. 1. Supervise data collection of trials
      2. Collect field samples for laboratory evaluation
      3. Help trainee livestock assistants and inspectors through demonstrations and refresher courses
   h. The PCV will have a counterpart at Yundum
   i. Working under the U.S. animal nutritionist at Abuko

10. a. Plant research
    b. B.S. in Botany or Biology
    c. July 1981-July 1985
    d. Four person/years
    e. Department of Animal Health and Production, Ministry of Agriculture and Natural Resources
    f. YBK/Sapu
    g. 1. Collect and identify plant communities
       2. Assist training in plant identification
       3. Devise and carry out research trials related to local ecology
    h. Working closely with the 8 Gambians trained in range management in a two-person PCV team, with a social scientist
    i. Working under the U.S. range management specialist at Abuko

11. a. Social science research
    b. B.A. in Agricultural Economics or Rural Sociology
    c. July 1981-July 1985
    d. Four person/years
    e. Project Socio-economic Unit, Ministry of Agriculture and Natural Resources
    f. YBK/Sapu
    g. Perform research studies on farmer attitudes toward range management
    h. Working in a two-person PCV team with the plant researcher and with the 8 Gambians trained in range management
    i. Working on data collection for the socio-economic unit within the Ministry

12. a. Graphics specialist
    b. B.A. in Art or B.S. with Graphic Skills
    c. July 1980-July 1984
    d. Four person/years
    e. Extension Aids Unit, Ministry of Agriculture and Natural Resources
    f. Yundum/Banjul
    g. To prepare art work for extension services materials (e.g., brochures, agricultural crop manuals, drafting, printing, posters)
    h. Working closely with liaison representatives in the unit from Operational Departments within the Ministry
    i. Working under the direction of the Extension Aids Unit

13. a. Extension program and materials evaluator
    b. B.A. in Social Sciences with some quantitative skill training
    c. July 1979-July 1983
    d. Four person/years
    e. Project Socio-economic Unit, Ministry of Agriculture and Natural Resources
    f. Yundum/Banjul
    g. Plan and set up a feedback system to measure the impact of extension services by collecting and analyzing field data
    h. Working closely with extension agents and unit staff
    i. Working under the project socio-economic unit within the Ministry

ANNEX R.

APPENDIX OF PRE-PROJECT RESEARCH PROPOSALS

ACTION MEMORANDUM TO THE ASSISTANT ADMINISTRATOR FOR AFRICA

FROM: AFR/SFWA, David Shear

SUBJECT: Proposed Socio-Economic Research Studies under the Planning, Management and Research Project 625-0929.

Problem: Your approval is required to execute a grant of $375,000 from SH appropriation to the Gambia for Planning, Management and Research Project 625-0929.

Discussion:

1. Your authorization of the proposed technical assistance grant to the Gambia will provide necessary funding of technical services for the design and execution of two simultaneous and complementary socio-economic field studies of agricultural resource management on farms in that country. The studies are entitled "A Technical and Economic Assessment of Agricultural Resource Management on Mixed Enterprise Farms in the Gambia" and "The Anthropology of Agricultural Resource Management in the Gambia" and will be carried out in collaboration with a U.S. Title XII University. The purpose of these studies is to provide detailed quantitative and qualitative data on critical factors affecting the development of mixed farming systems in the Gambia. It is anticipated that such information and subsequent analysis will be of great value to development planners and project implementors in the formulation of effective development strategies for the Gambia River Basin as a whole and for individual AID projects such as the Gambia Soil and Water Conservation Project, the Gambia Mixed Farming and Resource Management Project, the Gambia Forestry Project, and the on-going Gambia River Basin Planning Study. In the larger context of West Africa, it is expected that AID will derive important insights from these studies which will be directly relevant to on-going work in neighboring countries having similar technical, economic and social circumstances.

2. The proposed research is geared to serve a variety of AID/Gambian development interests. Data and analysis on all representative farming systems in the country are, for example, critical to the AID Soil and Water Management Unit personnel who will need detailed knowledge of local land use patterns in order to carry out their work. This research is of particular relevance since no research provision is included in their present project for collection of such data. The site for the anthropological research was chosen in early 1978 specifically to be in an area just upriver from the probable site of a proposed salt-water instrusion barrage where substantial irrigable land exists but where competition from other land uses are most severe. This barrage is presently being evaluated through the Gambia

River Basin Studies. Thus the research will pinpoint the tradeoffs between alternative development strategies in this vital area. The farm management survey will complement this study with micro-level farm data on a representative sub-set of the compounds in the general survey which are specifically oriented toward rice production in the swamp areas. Furthermore, the proposed research is designed to dovetail precisely with the socio-economic unit of the Gambia Mixed Farming and Resource Management Project. Enumerators trained in this pre-project research will be retained by the permanent socio-economic unit within the Gambian government structure; all data collected by the researchers will be retained on the computer of this unit; and studies designed for the project unit are keyed to the pre-project studies' findings including retention of some of the original compounds in the on-going farm management sample set to be established by the project unit. These are but some of the multiple uses of this proposed research and the inter-relationships between the research and other AID/Gambian in-country activities.

3. All funding required under this research grant will be obligated by grant agreement between AID and the Government of the Gambia from FY 1978 funds. The grant agreement will be negotiated on behalf of AID by the specialists at REDSO/WA in Abidjan in collaboration with the AID Affairs Officer in Banjul. The grant agreement will be signed in Banjul in September 1978. The overall dollar breakdown of the funds requested is presented below in tabular form.

Category of Funding	FY 1978 Funding
Technical Assistance	$268,580
Commodities	52,875
Services	10,000
Other	43,545
Total	$375,000

4. In addition to AID grant funding enumerated above, the Government of the Gambia through the Ministry of Agriculture and Natural Resources will provide personnel for recruitment and training of enumerators, design of questionnaires administration of grant funds, and research supervision. Additionally, office space, vehicle maintenance facilities and services, and field support equipment will be contributed by the Government. The total value of contributed host country goods and services is estimated at $45,000.

5. The major thrust of the proposed research is to provide socio-

economic data which can be used to better evaluate on-going and projected AID activities in the Gambia.

6. With respect to the United States concerns about human rights, there is no issue in the Gambia.

7. The proposed research was reviewed by the Technical Review Committee on two occasions. Final technical review was held on August 10, 1978 at which time the Committee recommended unanimously to proceed with the research.

8. The proposed research has no activity that would affect in any way the physical environment of the Gambia. It is, therefore, unnecessary to conduct any environmental analysis.

9. There are no major conditions and/or covenants required for execution of the proposed grant agreement.

10. No waivers are required for this research.

11. The major implementing agencies involved in the proposed research will be the Ministry of Agriculture and Natural Resources of the Government of the Gambia, AID and an American Title XII land grant institution chosen by mutual consent of AID and the Government of the Gambia through standard AID bidding procedures.

12. As stated above, a formal committee review on the proposed research was held on August 10, 1978 at which time unanimous agreement to proceed was obtained.

13. No Congressional notification is required to proceed to authorization of this grant funding.

14. The officer responsible for this grant agreement in the field is Mr. Douglas Broome, AID Affairs Officer in Banjul in active collaboration with Mr. John Eriksen, Regional Agricultural Economist at REDSO/WA in Abidjan. The office responsible for the project in AID/W is AFR/SFWA.

Recommendation: That you approve the attached cable to Banjul and Abidjan and thereby authorize REDSO/WA in collaboration with AAO/Banjul to proceed immediately with negotiation and signature of the grant agreement.

Clearance:
AFR/SFWA:DMiller
AFR/SFWA:HFarnham (draft)
AFR/SFWA:OJLustig(draft)
AFR/SFWA:JJohn(draft)

Clearance: (cont'd)
AFR/SFWA/SDP:DTinsler(draft)
AFR/SFWA/SDP:CHanrahan(draft)
AFR/DR:NUlsaker(draft)
AFR/DR:TCrawford(draft)
Title XII BIFAD:RCarmody (draft)

Drafted: REDSO/Abidjan, JEriksen:fmse:8/14/78

UNCLASSIFIED

REDSO/ABIDJAN:JERIKSEN/TCRAWFORD:MM
8/15/78 EXT 20994
AA/AFR:GTBUTCHER

DAA/AFR:WHNORTH
AFR/SFWA:DMILLER
AFR/SFWA/PSA:OLUSTIG{SUBS}
AFR/SFWA/SDP:DTINSLER{SUBS}
AFR/SFWA:DSHEAR
AFR/SFWA:HFARNHAM{SUBS}
AFR/SFWA/PSA:JJOHN{SUBS}
AFR/SFWA/SDP:CHANRAHAN{SUBS

PRIORITY ABIDJAN, BANJUL PRIORITY

PRIORITY DAKAR

AIDAC

E.O. 11652: N/A

TAGS:

SUBJECT: PROPOSED SOCIO-ECONOMIC RESEARCH STUDIES FOR THE GAMBIA

REF: A} REDSO RESEARCH PROPOSAL OF 6-1978, B} ABIDJAN 7083

1. AA/AFRICA HAS SIGNED ACTION MEMO AUTHORIZING DOLS 375,000 FOR SUBJECT STUDIES AS PER BUDGET ITEMS PRESENTED IN REFS {A} AND {B}. FUNDS WILL BE DEALLOTTED FROM REGIONAL PM AND R ALLOTMENT AND REALLOTTED TO RESDO/WA. SPECIFIC FISCAL DATA WILL FOLLOW BY SEPTEL.

2. AA/AFRICA AUTHORIZES REDSO/WA, IN COLLABORATION WITH AOO/BANJUL, TO DRAFT AND NEGOTIATE A GRANT AGREEMENT BETWEEN GOTG MINISTRY OF AGRICULTURE AND AID FOR THESE RESEARCH STUDIES. AFTER REVIEW AND APPROVAL OF DRAFT BY RLA/ABIDJAN, AOO/BANJUL AUTHORIZED TO EXECUTE PROAG.

3. DRAFTING OF PROAG WILL BE COMPLETED BY ERIKSEN AND RLA FOLLOWING ERIKSEN'S RETURN ABIDJAN O/A SEPTEMBER 5. NEGOTIATIONS WITH GOTG WILL BE CARRIED OUT AS SOON THEREAFTER AS POSSIBLE.

4. FYI: ANTICIPATE AFR/SFWA/SDP WILL PROVIDE ECONOMIST AND

GTB
IE/TC
WHN
DM
DS

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ANTHROPOLOGIST TO DRAFT TERMS OF REFERENCE FOR STUDIES EARLY OCTOBER. TOR SHOULD BE CIRCULATED NLT OCT. 20 TO REQUEST TECHNICAL PROPOSALS FROM TITLE XII UNIVERSITIES. CONTRACT WILL BE AWARDED ON BASIS OF JOINT GOTG/AOO-BANJUL/ REDSO REVIEW OF PROPOSALS AND SHOULD BE SIGNED NLT JAN. 31 SO AS TO PERMIT FIELDING OF CONTRACT RESEARCH TEAM PRIOR TO ONSET OF NEXT RAINY SEASON. END FYI.YY

PROPOSAL FOR GRANT AGREEMENT FOR RESEARCH PROJECT COVERING THE GAMBIA SECTOR OF THE GAMBIA RIVER BASIN

Banjul, The Gambia
June 1978

I. DESCRIPTION OF THE RESEARCH PROJECT

This Grant Agreement between the Government of The Gambia acting through the Ministry of Agriculture and Natural Resources (hereinafter referred to as the "GOTG") and the United States of America acting through the Agency For International Development (hereinafter referred to as AID) provides necessary funding of technical services for the design and execution of two simultaneous and complementary field studies of agricultural resource management in The Gambia. The studies are entitled "A Technical and Economic Assessment of Agricultural Resource Management on Mixed Enterprise Farms in The Gambia" and " The Anthropology of Agricultural Resource Management in The Gambia". The objective of these studies is to provide detailed quantitative and qualitative data on critical factors affecting the development of mixed farming systems in The Gambia. It is anticipated that such information in analyzed processed form will be of great use to development planners and project implementors in the formulation of effective development strategies for the Gambia River Basin as a whole and for individual AID projects such as the Gambia Soil and Water Conservation Project and the Gambia Mixed Farming and Resource Management Project. In the larger context of West Africa, it is expected that AID will derive important insights from these studies which will be directly relevant to on-going work in neighboring countries having similiar technical, economic and social circumstances.

The first study referred to above - "A Technical and Economic Assessment of Agricultural Resource Management on Mixed Enterprise Farms in The Gambia" - will be executed over a period of twenty-four months from the signing of this Agreement. The assessment will be conducted by personnel employed on a contractual basis by the Government of The Gambia with the assistance of AID technical specialists from the Regional Economic Development Services Office (REDSO/WA) in Abidjan, Ivory Coast; the AID country office in Banjul, The Gambia; and a suitable American land grant university.

The study will be executed in two phases : a field data collection phase and a data processing and analysis phase. Field data collection under the study will be undertaken with the participation of a stratified representative sample drawn from among the 24,000 farm exploitations in The Gambia. It is anticipated that this sample will represent approximately one percent of all farms - i.e. 250 farm compounds - and will be stratifed on the basis of five criteria :

1. Geographic location in The Gambia.
2. Total physical size of farm exploitation.
3. Size of the active farm work force.
4. Size and type of crop enterprises.
5. Size and type of animal enterprises.

The field enumerators will obtain from each participating farm compound a directed record of technical and economic information

pertaining to the management of his or her total and individual farm enterprises during a twelve month period to commence in early 1979. This information will include:

1. Detailed quantitative data on each crop enterprise on the farm including type of crop grown, acreage used, cultural methods, crop yields and final disposition of product.

2. Detailed information on use of non-cropland during the year including fallow and permanent grazing woodland.

3. Detailed data on herd/flock structure by age, class, live-weight and sex with associated estimates of critical productive parameters.

4. Detailed assessment of technical factors affecting livestock productivity such as estimates of the quantity and quality of available feed resources; the state of animal health in herds and flocks; product output by animal class and category; and the final disposition of all products.

5. Detailed economic data on actual management behavior in allocation of farm resources to individual farm enterprises.

6. Labor allocation data for all farm enterprises and non-farm activities.

7. Information on exogeneous factors affecting profitability of all farm enterprises including such items as land tenure systems, availability of short and long-term credit, and development policies of the government as related to rural development.

The processing and analysis of data collected in the first phase of the study will be carried out in the United States under a contractual agreement between the GOTG and a suitable American land grant university. The final report for the study will be issued within twenty-four months of the signing of the Grant Agreement.

Under the second study provided for under this Agreement - "The Anthropology of Agricultural Resource Management in The Gambia"- an anthropologist under direct contract with AID will carry out field research in the central area of The Gambia with the goal of analyzing systematically the forms of land use and management of agricultural and herding resources that are practiced there and the social, economic and political contexts within which such activities take place.

Specifically the contractor will :

1. Review the pertinent ethnographic, economic and geographic

literature on West African mixed agricultural systems and on the peoples of the Senegambia for a three month period under the general supervision of a senior social scientist knowledgeable about Gambian conditions.

2. Carry out fifteen to seventeen months of field case study work in McCarthy Island and/or Upper River Divisions of The Gambia living in a village setting(s).

3. Carry out field research, aided by a Gambian research associate and field assistants as required, which includes but is not necessarily limited to analyzing :

   A.) The local agricultural ecology with an emphasis on the interplay between crop and livestock systems and the natural environment as modified by man.

   B.) The ownership, use and management of productive resources, including land, labor, tools and herds. The contractor will study strategies of resource control and maximization, conservation techniques, differing roles and interests in productive systems - i.e. man/woman; farmer/"strange farmer", herd owner/contracted herd manager - as they affect resource use, and the social relations of production.

   C.) The domestic economy and the shares of crop and herding activities within it; decision-making in marketing and home consumption of produce and animals; income distribution in differing classes of domestic economy; the subsistence contribution of animal and fish products; the structures of formal and informal marketing; non-economic decisions in resource allocation - i.e. loaning, gift-giving, political and ritual gains, and investments in people.

   D.) Sociocultural variation in mixed farming and resource management especially the differences between Fula and Mandinka land use needs for livestock and crops; cultural versus production efficiency factors underlying ethnic distinctions; social relations of cooperation and conflict among compounds and communities over resource control and management issues like access to fresh water, use of land for grazing/forestry/upland crops, and use of ricelands in the swamps.

   E.) The effects of increased government intervention in resource management activities through development planning and project implementation.

II. DETAILED BUDGET FOR AID CONTRIBUTION

The budget anticipated for the Research Project appears below by study. Adjustments in the budget may be made by mutual agreement of the Parties hereto provided that the total amount of the Grant is not exceeded.

A.) A Technical and Economic Assessment of Agricultural Resource Management on Mixed Enterprise Farms in The Gambia.

I. Field Data Collection Phase (14 months duration)

A.) Personnel:	
1. Senior Field Supervisors Salaries (5 men x 14 months x $ 250/month)	$ 17,500
2. Field Enumerators Salaries (35 men x 14 months x $ 100.00/month)	49,000
3. Per Diem Allowances (40 men x 75 days x $ 3.00/day)	9,000
B.) Personnel Transportation:	
1. Motorbikes (5 men x 1 each x $ 600.00)	$ 3,000
2. Bicycles (35 men x 1 each x $ 150.00)	5,250
3. Maintenance and Operation of Motorbikes (5 motorbikes x $ 700.00)	3,500
4. Maintenance of Bicycles (35 bicycles x $ 75.00)	2,625
C.) Production of Questionaire and other forms	$ 8.000
D.) Field Equipment : clipboards, animal ear tags, weigh tapes, field measuring equipment. etc.	$ 10,000
Sub-total	$ 107,875

II. Data Processing and Analysis Phase (10 months duration)

A.) Personnel	
1. Agronomist (1 man/month x $ 3,000)	$ 3,000
2. Livestock Production Specialist (1 man/month x $ 3,000)	3,000
3. Agricultural Economist (1 man/month x $ 3,000)	3,000
4. Agricultural Economist (12 man/months x $ 3,000)	36,000
5. Research Assistants (2 persons x 6 man/months each x $ 600/month)	7,200

B.) Computor card preparation and sorting	$ 5,000
C.) Computor Analysis Time	$ 6,000
D.) Materials and Supplies	$ 2,500
E.) Production and Delivery of 50 copies of final report	$ 3,000
G.) Field Travel and Per Diem	
1. Three Round-trips USA/The Gambia	$ 5,000
2. Per diem for 150 field days X $ 55.00/day	$ 8,250
H.) Miscellaneous Costs and Inflation at 15 %	$ 28,500
Sub-total	$ 110,450
Grand Total for the Study	$ 218,325

B.) The Anthropology of Agricultural Resource Management in The Gambia

I. Personnel	
A.) Salary of the principal researcher (1 person x 24 man/months x $ 1,200/month)	$ 28,800
B.) Salary of senior consultant (1 person x 3 man/months x $ 3,000/month)	9,000
C.) Field Research Assistants including the principal research associate, five field research associates, and two interpreters	22,000
II. International Transportation	
A.) Transportation for principal researcher	$ 5,000
B.) Transportation for senior consultant including per diem	10,000
III. Logistic Support	
A.) Field vehicle	12,000
B.) Vehicle maintenance and operation	3,000
C.) Housing, furnishings and appliances	5,000
IV. Research Expenses	
A.) Equipment and office supplies	3,000
B.) Secretarial assistance and final report preparation	1,000

V. Other direct costs including pre-contract expenses	$ 1,500
VI. Miscellaneous Costs and Inflation at 15 %	$ 15,045
Grand Total for the Study	$ 115,345

The grand total for the entire Grant is $ 333,670.00

III. GOTG CONTRIBUTION TO THE RESEARCH PROJECT

To complement the contribution to the project by AID, the GOTG will assist in implementation of all research activities through provision of personnel services and office and training facilities in-country. Services provided through the Ministry of Agriculture and Natural Resources will include:

1. Recruitment, selection and field supervision of project personnel in collaboration with AID personnel.

2. Technical and administrative services in the design and execution of field activities.

3. Provision of transportation for supervisory personnel on an as available basis.

4. Provision of office and training facilities for instruction of field enumerators and initial processing of field data.

5. Provision of administrative personnel for all aspects of Grant administration.

TELEGRAM

INDICATE
☐ COLLECT
☐ CHARGE TO

FROM: AMEMBASSY ABIDJAN

CLASSIFICATION: UNCLASSIFIED

E.O. 11652:
TAGS:
SUBJECT:

ACTION:

ACTION: SECSTATE WASHDC IMMEDIATE

INFO: AMEMBASSY BANJUL

UNCLASSIFIED ABIDJAN _____

AIDAC

FOR AFR/SFWA/SDP, DOUG TINSLER

E.O. 11652: N/A

SUBJECT: GAMBIA MIXED FARMING AND RESOURCE MANAGEMENT PROJECT (635-0203)

REFS: (A) STATE 121001, B() STATE 172153, (C) ABIDJAN 6572, (D) STATE 183867, (E) TINSLER/ERIKSEN/ARONSON TELCON 7/25/78.

1. REFS B AND D, TO WHICH WE ARE RESPONDING IN THIS MESSAGE, WERE RECEIVED IN BANJUL AFTER THE SUBJECT PROJECT DESIGN TEAM HAD DEPARTED AND WERE REPEATED TO ABIDJAN FOR OUR ACTION. REF E WAS MOST HELPFUL IN CLARIFYING THE SUBSTANCE OF THE TWO CABLES.

2. REDSO IS APPRECIATIVE OF AID/W CONCERN TO GET THE PROPOSED STUDIES FUNDED AND IMPLEMENTED ASAP. MISSING DATA FROM THE ORIGINAL AND FOLLOW-UP PROPOSALS YOU REVIEWED WERE LARGELY DUE TO OUR ASSUMPTION THAT REDSO PERSONNEL COULD DIRECTLY SUPERVISE A MAJOR PART OF THE REQUIRED FIELDWORK FOR THE STUDIES. GIVEN THE TIME THAT HAS PASSED

DRAFTED BY:	DRAFTING DATE	TEL. EXT.	CONTENTS AND CLASSIFICATION APPROVED BY
JEriksen/lb	7/27/78		A.H. Boehme, Act. Dir. REDSO

CLEARANCES:
DAronson (draft)

UNCLASSIFIED
CLASSIFICATION

50152-101

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(Formerly FS-413 [illegible])
January 19[illegible]5
Dept. of State

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SINCE THIS RESEARCH WAS ORIGINALLY PROPOSED IN AUGUST 1977 AND THE FORTHCOMING DEPARTURE FROM ABIDJAN OF ARONSON AND ERIKSEN, REDSO UNDERSTANDS AID/W NEED TO HAVE FULLER KNOWLEDGE OF PROPOSAL. WE HOPE THE FOLLOWING INFORMATION WILL SUFFICE.

3. RE REF B, PARA 2, OBJECTIVES OF THE PROPOSED RESEARCH AND RELEVANCE TO OTHER AID PROJECTS, REF C, PARA 2 NOTES THAT RESEARCH IS GEARED TO SERVE A VARIETY OF USAID/GAMBIAN DEVELOPMENT INTERESTS. DATA AND ANALYSIS ON ALL REPRESENTATIVE FARMING SYSTEMS IN COUNTRY ARE, FOR EXAMPLE, OBVIOUSLY CRITICAL TO THE SOIL AND WATER MANAGEMENT PERSONNEL WHO WILL NEED DETAILED KNOWLEDGE OF LOCAL LAND USE IN ORDER TO CARRY OUT THEIR WORK ESPECIALLY SINCE NO RESEARCH PROVISION IS INCLUDED IN THEIR PROJECT FOR COLLECTION OF SUCH DATA. REGARDING THE RIVER BASIN STUDIES, THE ANTHROPOLOGICAL RESEARCH SITE WAS CHOSEN IN EARLY 1977 SPECIFICALLY TO BE IN THE AREA JUST UP RIVER FROM THE PROBABLE BARRAGE SITE WHERE SUBSTANTIAL IRRIGABLE LAND EXISTS BU WHERE LIVESTOCK NEEDS FOR DRY SEASON WATER AND GRAZING ARE MOST SEVERE. THUS THE RESEARCH WILL PINPOINT THE TRADEOFFS BETWEEN ALTERNATIVE DEVELOPMENT STRATEGIES IN THIS VITAL AREA. THE FARM MANAGEMENT SURVEY WILL COMPLEMENT THIS STUDY WITH MICRO-LEVEL FARM DATA ON A REPRESENTATIVE SUB-SET OF THE COMPOUNDS IN THE GENERAL SURVEY WHICH ARE SPECIFICALLY ORIENTED TOWARD RICE PRODUCTION IN THE SWAMP AREAS. REGARDING THE SUBJECT PROJECT UNDER DESIGN, THE PROPOSED RESEARCH IS GEARED TO DOVETAIL PRECISELY WITH THE SOCIO-ECONOMIC UNIT THAT IS BUILT INTO THE PROJECT.

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ENNUMERATORS TRAINED IN PRE-PROJECT RESEARCH WILL BE RETAINED BY THE UNIT OR SENT OVERSEAS FOR ADDITIONAL TRAINING; ALL DATA COLLECTED WILL BE RETAINED ON THE COMPUTOR OF THE UNIT; STUDIES DESIGNED FOR THE PROJECT UNIT ARE KEYED TO THE PRE-PROJECT STUDIES' FINDINGS INCLUDING RETENTION OF SOME OF THE ORIGINAL COMPOUNDS IN THE FARM MANAGEMENT SAMPLE SET. THESE ARE MULTIPLE EXAMPLES OF THE INTERRELATIONSHIPS BETWEEN THE PROPOSED RESEARCH IN THE GAMBIA AND OTHER USAID/GAMBIAN ACTIVITIES; HOWEVER, NO RESEARCH CAN EVER SERVE ALL THE CONCEIVABLE NEEDS OF ALL INTERESTED PARTIES AND STILL RETAIN ITS INTEGRITY AS RESEARCH. THE RESEARCHERS WILL BE FULLY AVAILABLE FOR FURTHER DISCUSSIONS ABOUT ADDING TOPICS OF CONCERN TO THE RESEARCH AS THEY ARE SURFACED BY AID/W OR BY OTHER PROJECT TECHNICIANS ARRIVING IN THE COUNTRY. KEEPING BOTH THE BROAD INTERESTS AND THE NEED FOR RESEARCH INTEGRITY IN MIND, THEREFORE, THE OVERALL OBJECTIVE OF THE RESEARCH IS AS FOLLOWS: TO PROVIDE INTENSIVE AND EXTENSIVE KNOWLEDGE OF THE SOCIO-ECONOMIC ASPECTS OF AGRICULTURAL PRODUCTION SYSTEMS IN THE GAMBIA NECESSARY FOR THE FORMULATION OF POLICY AND PROJECT STRATEGIES FOR CHANGE IN THE GAMBIA RIVER BASIN. THE BRITISH ODM LAND RESOURCES DIVISION DID SIMILAR RESEARCH ON FIELD CROPS IN 1972-73 BUT THE PROPOSED AID-FUNDED RESEARCH ON FARMING SYSTEMS WILL ALSO BRING INTO FULL FOCUS NON-CROP ASPECTS OF THE OPERATIVE FARMING SYSTEMS SO THAT THE HARD DECISIONS ON INTEGRATED RESOURCE MANAGEMENT AND ALLOCATION CAN BE MADE IN AN APPROPRIATE ~~EEEE~~ CONTEXT AND NOT JUST FROM CROP SCIENCE OR ENGINEERING BACKGROUND INFORMATION.

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4. RE REF B, PARA 3, WE AGREE THAT ALL RESEARCH SHOULD BE BROUGHT UNDER ONE UMBRELLA AND WE SPECIFICALLY RECOMMEND CORNELL UNIVERSITY FOR THIS PURPOSE. THIS IS BECAUSE:

A. THEY HAVE A SUPERIOR INTERNATIONAL AGRICULTURE PROGRAM THAT CONCENTRATES ON MULTIDISCIPLINARY RESEARCH IN INTERDISCIPLINARY SETTINGS BACKED UP BY THE BEST AGRICULTURAL LIBRARY IN THE COUNTRY;

B. THE STAFF INCLUDES AT LEAST FOUR FULL PROFESSORS WITH ACTUAL FIELD EXPERIENCE IN THE GAMBIA FROM THE FIELDS OF ANIMAL SCIENCE, TROPICAL AGRONOMY, TROPICAL SOIL SCIENCE AND AGRICULTURAL ECONOMICS PLUS A LARGE NUMBER OF ADDITIONAL PERSONNEL WITH WEST AFRICAN AREA EXPERIENCE.

C. ERIKSEN IS RETURNING TO CORNELL IN JANUARY 1979 AND COULD EITHER PARTICIPATE DIRECTLY IN THE RESEARCH PROJECT OR PROVIDE BACKSTOPPING FOR OTHER UNIVERSITY STAFF. HE IS NOT AVAILABLE THROUGH ANY OTHER INSTITUTION.

D. ARONSON COULD LIAISON ON THIS RESEARCH MOST EASILY WITH CORNELL FROM HIS BASE AT MCGILL UNIVERSITY IN MONTREAL UNDER A CONTRACTUAL ARRANGEMENT.

E. CORNELL HAS ALREADY NOTIFIED THE TITLE XII BIFAD COMMITTEE THAT IT WOULD LIKE TO BID FOR THE TITLE XII CONTRACT ON THE SUBJECT UNDER DESIGN. SHOULD THE UNIVERSITY OBTAIN BOTH THE PRE-PROJECT AND PROJECT CONTRACTS FOR WORK IN THE GAMBIA, THEN THIS WHOLE ~~EAKA~~ PACKAGE WOULD TRULY BE UNDER ONE UMBRELLA.

5. GIVEN ALL OF THE ABOVE, HOWEVER, WE ARE LESS SURE THAT USING ONE ORGANIZATION FOR THE PRE-PROJECT RESEARCH WILL REDUCE COSTS

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AS IS SUGGESTED IN REF D., AS PROPOSED, THE RESEARCH STUDIES DO NOT NOW INCLUDE ANY UNIVERSITY OVERHEAD CHARGES ON THE U.S. SALARIES COMPONENT. OVERHEAD OF APPROXIMATELY 65 PERCENT ADDED TO BUDGET ITEMS A.II.A. AND B.I.B. ON PAGES 5 AND X 6 OF THE PROPOSAL WOULD ADD DOLLARS 39,780 TO THE TOTAL PROPOSAL AS IT NOW STANDS. THIS WOULD BRING THE TOTAL TO DOLLARS 373,450. THE MAJOR REASON WE SEE FOR PUTTING THE RESEARCH UNDER ONE INSTITUTIONAL UMBRELLA VIS-A-VIS AN AMERICAN INSTITUTION IS ADMINISTRATIVE NEATNESS, NOT REDUCED COSTS. IN ANY CASE, THE RESEARCH WOULD BE UNDER ONE UMBRELLA IN THE GAMBIA SINCE ALL FIELD ACTIVITIES MUST BE CARRIED OUT UNDER THE DIRECTION OF THE MINISTRY OF AGRICULTURE AND NATURAL RESOURCES' PROGRAM PLANNING AND MANAGEMENT UNIT.

6. RE REF B, PARA 5, THE RESEARCH PROPOSED IS FULLY INTEGRATED WITH THE ACTIVITY DESCRIBED IN THE PID AS COMPONENT SIX BUT A CAUTION IS WARRANTED. THE PP TEAM, WHICH HAS ALREADY FINISHED THE FIELD PORTION OF ITS DESIGN WORK, WAS COGNIZANT OF REALISTIC LEAD TIMES NECESSARY TO FIELD STAFF UNDER THE SUBJECT PROJECT AFTER COMPLETION OF X HOUSING CONSTRUCTION POSSIBLY BY JUNE 1979. PP TEAM JUDGMENT WAS THAT THE EARLIEST ETA FOR MIXED AG PROJECT TEAM WILL BE AUGUST 1979 AND THIS COULD EASILY SLIP UNTIL LATER IN 1979. BY THAT TIME, THE MAJOR PRT MAJOR PART OF THE PROPOSED FIELD RESEARCH WILL ALREADY BE COMPLETED ON THE ASSUMPTION THAT FY 78 RESEARCH FUNDING PERMITS RESEARCHERS TO BE IN THE FIELD BY THE FIRST QUARTER OF 1979. THIS IS, AFTER ALL, THE WHOLE PURPOSE OF THE PRE-PROJECT RESEARCH STUDIES: THAT THE PROJECT TEAM WILL ARRIVE TO FIND KNOWLEDGABLE

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PROFESSIONALS, PROCESSED FIELD DATA, AND REPORTS READY TO GET THEM OFF TO A FLYING START. ONE SHOULD ALSO NOTE THAT FIELD SUPERVISORS AND RESEARCH ASSOCIATES FROM THE RESEARCH STUDIES WILL BE AVAILABLE THEN EITHER TO GO INTO THE PROJECT SOCIO-ECONOMIC UNIT UNDER THE MINISTRY'S PPMU OR TO GO FOR FURTHER TRAINING BEFORE JOINING THE UNIT. THIS WILL BUILD CAPACITY FOR CONTINUING COLLECTION OF PLANNING DATA AND PROVIDE ON-THE-TRAINING OF GAMBIANS FOR A PERMANENT UNIT INSTITUTIONALIZED WITHIN THE MINISTRY WHICH IS A MAJOR OBJECTIVE OF THE SUBJECT RE PROJECT.

7. RE REF B, PARA 7, GAMBIAN MINISTRY OFFICIALS, USAID STAFF AND CORNELL PERSONNEL ARE FULLY COGNIZANT OF RESEARCH METHODS PROPOSED IN RESEARCH PROPOSAL.

A. INTENSIVE (ANTHROPOLOGICAL) RESEARCH IS TO BE DONE AS A CASE STUDY IN A CRITICAL AREA OF THE COUNTRY. METHODS WILL INVOLVE PARTICIPANT OBSERVATION AND SMALL SCALE SOCIAL SURVEYS IN ONE OR A SMALL NUMBER OF SETTLEMENTS IN THE NIAMINA DISTRICT OF MACCARTHY ISLAND DIVISION. DANKUNKU TOWN AND/OR CHOYA VILLAGE AREAS ARE PRIME CANDIDATES AS ACTUAL SITES. TOR IN PROPOSAL SUGGESTS TOPICS OF CONCERN WHICH ANTHROPOLOGICAL RESEARCH METHODOLOGY TACKLES NOT SO MUCH BY HAVING AN ABSTRACT "SAMPLING FRAME" AS BY HAVING CONTINUOUS CONTACT WITH VILLAGERS FOR DISCUSSIONS IN THE LOCAL LANGUAGES WHILE TAKING NOTES ON THEIR CONCERNS AND CONCEPTS. WHILE THIS MAY SOUND METHODOLOGICALLY MESSY, IT IS PRECISELY THE METHODOLOGY THAT HAS ALLOWED ANTHROPOLOGY TO BECOME REPUTED FOR THE INTIMACY OR PERCEPTIVENESS THAT IT CONVEYS. IN THIS CASE, FULA LANGUAGE WILL

BE LEARNED AND USED. MORE PRECISE TOPICS THAN ARE IN THE TOR WILL BE DEVELOPED BY THE CONTRACTOR AND THE PRINCIPAL RESEARCHER RECRUITED.

B. EXTENSIVE (FARM MANAGEMENT) RESEARCH WILL UTILIZE A MORE ELABORATED SAMPLING METHODOLOGY IN ORDER TO PERMIT A DESCRIPTIVE FUNCTION FOR ALL MAJOR FARMING SYSTEMS IN THE GAMBIA WHILE MINIMIZING SAMPLING ERROR. IT WILL CONCENTRATE ON TYPES OF DATA THAT ARE QUANTITATIVE N IN NATURE - BOTH SINGLE POINT REGISTERED AND FLOW DATA. QUALITATIVE DATA WILL BE COLLECTED FOR CERTAIN PURPOSES SUCH AS FORAGE QUALITY ESTIMATES. METHODOLOGICAL APPROACH WILL BE A ONCE WEEKLY INTERVIEW IN THE LOCAL LANGUAGE WITH EACH PARTICIPATING COMPOUND IN A SAMPLE OF APPROXIMATELY 250 COMPOUNDS GROUPED IN 25 VILLAGES. SELECTION OF SAMPLE COMPOUNDS WILL BE BASED ON A FOUR BY FOUR MATRIX WITHIN A LARGER STRATIFICATION OF THE COUNTRY INTO RAINFALL ZONES. THE THREE RAINFALL ZONES WILL BE: LESS THAN 1000 MMS., 1000 TO 1200 MMS., AND GREATER THAN 1200 MMS. THE FOUR BY FOUR MATRIX OF FARMING SYSTEM CHARACTERISTICS WILL CONSIST OF FOUR CATEGORIES OF CROP ENTERPRISES: RICE/SWAMP LAND, GROUNDNUTS/COLLUVIAL SOILS, FOODGRAINS/UPLAND SOILS, AND OTHER OR NO CROP ENTERPRISES AND FOUR CATEGORIES OF LIVESTOCK ENTERPRISES: OWNER/OPERATOR, ANIMAL TRACTION OPERATOR ONLY, OWNER WITH CONTRACT HERDER, AND PERIURBAN LIVESTOCK PRODUCER. THIS WILL GIVE A FORTY-EIGHT STRATA MATRIX WITH 250 PARTICIPATING COMPOUNDS, WHICH IS E APPROXIMATELY A ONE PERCENT SAMPLE OF THE TOTAL RURAL POPULATION. COMPOUNDS WILL BE DRAWN AT RANDOM FROM LISTS BASED

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ON FIRST, A PRELIMINARY EVALUATION OF LIKELY PARTICIPANT COMPOUNDS FROM MEMBERSHIP LISTS OF THE AGRICULTURAL COOPERATIVES AND THE LIVESTOCK OWNERS ASSOCIATIONS PLUS CONSULTATIONS WITH DISTRICT COUNCIL OFFICIALS AND, SECOND, A FINAL EVALUATION THROUGH A DESCRIPTIVE QUESTIONNAIRE ADMINISTERED TO ALL LIKELY PARTICIPANT COMPOUNDS. IT IS HOPED THAT THIS SAMPLING FRAME WILL CAPTURE THE SALIENT CHARACTERISTICS OF ALL MAJOR FARMING SYSTEMS OPERATIVE IN THE GAMBIA FOR THE TIME PERIOD APPROXIMATELY APRIL 1979 TO MARCH 1980. DATA FROM THIS SAMPLE WILL BE PROCESSED FOR ANALYSIS USING STANDARD BUDGETING PROCEDURES FOR ENTERPRISE ANALYSIS AND PROBABLY A SPSS/LINEAR PROGRAMMING COMPUTOR PACKAGE. TAPES WILL NATURALLY BE E RETAINED FOR USE BY OTHER RESEARCHERS IN EXTRACTION OF ADDITIONAL DATA RELATIONSHIPS IN PROGRAMS DESIGNED BY THEM.

8. RE REF B, PARA 8, WE CALL YOUR ATTENTION TO REF C, PARA 3 WHIC STATES THAT GAMBIANS FOR PRINCIPAL RESEARCH POSITIONS ARE NOT BELIEVED TO BE AVAILABLE. AFTER TWO YEARS OF SEARCHING, WE KNOW OF NO SUCH PEOPLE IN THE GAMBIA, HAVING ALREADY INTERVIEWED THE ONLY TWO OR THREE CANDIDATES REMOTELY QUALIFIED, EACH OF WHOM TURNED OUT AS XXXX UNSUITABLE OR UNAVAILABLE UNDER ANY CIRCUMSTANC WE WOULD BE WILLING TO HELP THE CONTRACTOR CONTINUE A SEARCH FOR POTENTIAL GAMBIANS NOW IN THE U.S. OR THE U.K., BUT WE ARE NOT AT ALL CONFIDENT THEY EXIST EVEN OVERSEAS. WE PRESUME AID/W IS AWARE OF HOW SHORT THE SUPPLY OF TECHNICAL SKILLS IS IN THE GAMBI THERE IS NO UNIVERSITY, NO RESEARCH INSTITUTE, AND NO GAMBIAN SOCIAL SCIENTIST CARRYING OUR VILLAGE-LEVEL RESEARCH IN-COUNTRY

GIVEN THESE LIMITATIONS ON GAMBIAN PRINCIPAL RESEARCHERS, WE SUGGEST THE FOLLOWING STAFFING FOR THE TWO STUDIES:

A. FOR THE FARM MANAGEMENT STUDY:

THE AGRONOMIST: DR. LOY CROWDER, CORNELL UNIVERSITY

LIVESTOCK PRODUCTION SPECIALIST: DR. R.E. MCDOWELL, CORNELL UNIVERSITY.

AGRICULTURAL ECONOMIST (SHORT-TERM): DR. GEORGE CONNEMAN OR DR. KENNETH ROBINSON, CORNELL UNIVERSITY.

AGRICULTURAL ECONOMIST (LONG TERM): JOHN H. ERIKSEN, CORNELL UNIVERSITY

RESEARCH ASSISTANTS TO BE RECRUITED FROM PARTICIPATING UNIVERSITY DEPARTMENTS.

ALL FIELD SUPERVISORS AND ENNUMERATORS RECRUITED IN THE GAMBIA.

WE ASSUME AID/W IS COGNIZANT OF THE PROFESSIONAL QUALIFICATIONS AND EXPERIENCE OF ALL THE ABOVE NAMED PERSONS. FINAL COMPOSITION OF ANY TEAM IS OBVIOUSLY SUBJECT TO DISCUSSIONS BETWEEN AID, THE GOVERNMENT OF THE GAMBIA AND THE PARTICIPATING INSTITUTION.

B. FOR THE ANTHROPOLOGICAL STUDY:

SENIOR CONSULTANT: DR. DAN ARONSON OF MCGILL UNIVERSITY WORKING UNDER A CONTRACTUAL ARRANGEMENT WITH CORNELL U.

PRINCIPAL RESEARCHER: A DOCTORAL OR POST-DOCTORAL CANDIDATE TO BE RECRUITED UNDER CONTRACT TO CORNELL UNIV. WITH ACTIVE PARTICIPATION OF DR. ARONSON.

RESEARCHER COUNTERPART AND ENNUMERATORS RECRUITED IN GAMBIA.

9. WE TRUST THAT THE ABOVE INFORMATION SUFFICES TO ANSWER ALL QUESTIONS POSED IN REFS B., D., AND E. CONTACT TELEPHONE FOR ANY ADDITIONAL INFORMATION NEEDED FROM ARONSON IN EARLY AUGUST IS 617-469-0399. ERIKSEN REMAINS AT REDSO THROUGH DECEMBER 1978. WE WILL AWAIT AID/W RESPONSE TO THE INFORMATION

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AID AC

FOLLOWING WAS ORIGINALLY SENT FROM SECSTATE ACTION BANJUL ON 7/22/78 AND IS NOW REPEATED:

QUOTE

UNCLAS STATE 183367

AID AC

BANJUL PASS ERIKSON, ARONSON

E.O. 11652: N/A
SUBJECT: GAMBIA MIXED FARMING AND RESOURCE MANAGEMENT PROJECT (635-0203)

REF: (A) STATE 121001, (B) STATE 172153, (C) ABIDJAN 06572

Action Erikson Aronson
Info
Due Date 7/23
Action Taken

1. AID/W STATES IN REF B PARAGRAPH 1 THAT PROPOSALS SUBMITTED AS ANNEX TO SUBJECT PP COULD BE PREFUNDED FROM FUNY 1978 PM AND R BUDGET. BASIC PROPOSAL SUBMITTED BY REDSO TO AID/W CONSTITUTES MAJOR COMPONENT OF REQUESTED PROPOSAL. REQUEST REDSO AND DESIGN TEAM TO INCORPORATE ANSWER TO ISSUES RAISED IN PARAS 2, 3, 5, 7 AND 8 OF REF THESE SHOULD BE CABLED TO AID/W ASAP FOR CONSIDERATION. WISH EMPHASIZE THAT AID/W IS AS ANXIOUS TO FUND SUBJECT RESEARCH AS REDSO IN FY 1978 BUT WE ARE CONCERNED THAT RECORD DEMONSTRATES NOT ONLY UTILITY OF PROPOSAL BUT DOCUMENTS THE AGREED METHODOLOGY AND INSTITUTIONAL FRAMEWORK TO BE EMPLOYED IN EXECUTING STUDY.

2. WHILE INITIAL PHASE OF SURVEY WILL BE FUNDED FROM PM AND R FUNDS WISH EMPHASIZE THAT SUBSEQUENT PHASES SHOULD BE INCORPORATED IN SUBJECT PP.

3. TINSLER WILL CLARIFY BY PHONE. CHRISTOPHER UNQUOTE WYGANT
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BEST AVAILABLE DOCUMENT

DEPARTMENT OF STATE

TELEGRAM

INDICATE ☐ COLLECT ☒ CHARGE TO USAID

FROM	CLASSIFICATION
AMEMBASSY ABIDJAN	UNCLASSIFIED

E.O. 11652:
TAGS:
SUBJECT:

ACTION:

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ACTION: SECSTATE WASHDC IMMEDIATE

INFO: AMEMBASSY BANJUL IMMEDIATE

UNCLASSIFIED ABIDJAN 6572 O 121057Z Jul 78

AIDAC

SECSTATE FOR DOUGLAS TINSLER, AFR/SFWA/SDP; DONALD MILLER AND GORDON EVANS, AFR/SFWA

E.O. 11652 N/A

SUBJECT: GAMBIA MIXED FARMING AND RESOURCE MANAGEMENT PROJECT 635-0203

REF: STATE 172153

1. REDSO APPRECIATES AID/W REVIEW AND GUIDANCE ON RESEARCH STUDIES PROPOSED. HOWEVER, SINCE SUBJECT PP IS UNLIKELY TO BE IN FINAL FORM BEFORE MID-SEPTEMBER AND AID/W PP REVIEW WILL PROBABLY NOT TAKE PLACE BEFORE MID-OCTOBER, ANY QUESTION OF FY 1978 FUNDING FOR THE RESEARCH IS MOOT IF THIS IS THE ONLY METHOD OF PRESENTATION AID/W IS PREPARED TO ENTERTAIN.

2. THE SEPARATE PRESENTATION OF THE RESEARCH PROPOSALS AT THIS TIME WAS PRECISELY GEARED TO THE MANIFEST NEEDS OF THE GAMBIA RIVER BASIN STUDIES, THE AID SOIL AND WATER MANAGEMENT UNIT AND OTHER ON-GOING AID ACTIVITIES IN THE GAMBIA. IT WAS

DRAFTED BY:	DRAFTING DATE	TEL. EXT.	CONTENTS AND CLASSIFICATION APPROVED BY
J.Eriksen:mh	7/11/78		A.Boehme, A/DIR., REDSO/WA

CLEARANCES:

FORM 1521 (formerly PS-413) January 197 Dept. of State

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HOPED THAT THE RESEARCH COULD BE FUNDED SEPARATELY OF THE SUBJECT PROJECT AND THEREFORE HAVE RESULTS AVAILABLE IN RELATIVELY SHORT ORDER TO SERVICE THE NEED OF ALL ACTIVITIES FOR CONCRETE FIELD DATA. IF THIS MM RESEARCH IS TO BE TIED STRICTLY TO THE SUBJECT PROJECT, IT IS HIGHLY UNLIKELY THAT ANY SUBSTANTIAL AMOUNT OF FIELD DATA WILL BE COLLECTED OR ANALYZED BEFORE LATE 1981 SINCE TECHNICIANS FOR SUBJECT PROJECT WILL NOT EVEN BE IN THE GAMBIA BEFORE THE SUMMER OF 1979 AT THE EARLIEST AND WILL CERTAINLY NOT BE IN POSITION TO SET UP A CREDIBLE FIELD DATA COLLECTION EXERCISE BEFORE THE CROP SEASON 1980-1981. THE CONSEQUENCES OF THIS AS WE SEE THEM WILL BE THAT THE INITIAL GAMBIA RIVER BASIN STUDIES WILL BE COMPLETED WITHOUT ANY ACCESS TO CURRENT OR RELIABLE FIELD DATA ON FARM-LEVEL ACTIVITIES IN THE GAMBIA AND THE SOIL AND WATER UNIT WILL BE WITHOUT EITHER ANALYZED DATA OR THE MEANS FOR FIELD DATA COLLECTION FOR AT LEAST TWO YEARS AFTER THE ARRIVAL OF THE PROJECT TEAM. THIS IS SO BECAUSE THERE IS NO PROVISION FOR THIS TYPE OF RESEARCH IN THE APPROVED SOIL AND WATER MANAGEMENT PP. LASTLY, THE SPECIFIC RESEARCH ENVISIONED IN THE SUBMITTED PROPOSALS WILL HAVE TO BE DROPPED SINCE IT WAS, AT LEAST IN PART, BASED ON THE AVAILABILITY AT REDSO OF DAN ARCHSON AND JOHN ERIKSEN TO FORMULATE METHODOLOGY FOR THE FIELD RESEARCH AND ASSIST THEIR GAMBIAN COUNTERPARTS IN ITS EXECUTION. SINCE BOTH OF THESE SPECIALISTS, WHO ALREADY HAVE TWO YEARS EXPERIENCE IN THE

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GAMBIA, WILL BE GONE FROM REDSO BY THE END OF THIS YEAR, THERE SEEMS LITTLE POINT IN PURSUING THIS APPROACH, UNLESS AID/W REX IS WILLING TO PROCEED WITH CONSIDERATION OF THESE PROPOSALS PRIOR TO AND INDEPENDENTLY OF THE SUBJECT PP REVIEW.

3. WITH REGARD TO THE ISSUE OF USE OF GRADUATE STUDENTS, AMERICAN OR GAMBIAN, THE FIRST STUDY MENTIONED IN REFTEL PARA 1 DOES NOT ENVISION ANY GRADUATE STUDENT PARTICIPATION. THE SECOND STUDY RECOMMENDS USE OF ONLY ONE GRADUATE STUDENT. IT IS ASSUMED THAT THIS GRADUATE STUDENT WOULD HAVE TO BE A NON-GAMBIAN SINCE THERE ARE NO REPEAT NO AVAILABLE GAMBIANS TRAINED IN ANTHROPOLOGY AT PRESENT AND NONE IN TRAINING TO OUR KNOWLEDGE. WHILE WE FULLY REALIZE THE CRITICAL IMPORTANCE OF TRAINING GAMBIANS IN ALL PHASES OF SOCIO-ECONOMIC FIELD WORK AND HAVE INCLUDED SUBSTANTIAL PROVISIONS FOR THIS IN THE SUBJECT PP, IT IS UNFORTUNATELY THE CASE THAT NO CAPACITY FOR ORGANIZED FIELD RESEARCH WORK CURRENTLY EXISTS IN THE GAMBIA NOR IS THERE ANY CAPACITY FOR LOCAL ~~REREX~~ PROCESSING AND ANALYSIS OF FIELD DATA EVEN IF IT COULD BE COLLECTED BY LOCAL TECHNICIANS. THE WHOLE CONCEPT OF THE PROPOSED RESEARCH WAS TO PROVIDE SOME BASIS FOR REALISTIC FIELD WORK BY ALL THE AID/GAMBIAN ACTIVITIES LISTED ABOVE WHILE A GAMBIAN CAPACITY TO EXECUTE SIMILAR STUDIES OVER THE MEDIUM AND LONG-TERM WAS BEING TRAINED AND NURTURED IN BOTH ACADEMIC AND FIELD SITUATIONS.

4. REDSO, THEREFORE, URGES AID/W TO RECONSIDER THE CONCERNS

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OF SETTLE WITH THE ABOVE PRACTICAL REALITIES IN MIND.

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FOLLOWING TELEGRAM SENT ACTION BANJUL INFO DAKAR ON 7 JU
REPEATED FOR YOUR INFO:

QUOTESTATE 172153

AIDAC BANJUL PASS ERIKSEN

E.O. 11652: N/A

TAGS:

SUBJECT: GAMBIA MIXED FARMING AND RESOURCE
JECT 635-0203

REF: (A) STATE 121001

1. PROJECT REVIEW COMMITTEE MET JUNE 28 TO
PRELIMINARY RESEARCH PROPOSALS RECENTLY RECEIVED FROM
AOO/BANJUL, QUOTE A TECHNICAL ECONOMIC ASSESSMENT OF
AGRICULTURAL RESOURCE MANAGEMENT ON MIXED ENTERPRISE FARMS
IN THE GAMBIA UNQUOTE AND QUOTE THE ANTHROPOLOGY OF
RICULTURAL RESOURCE MANAGEMENT IN THE GAMBIA UNQUOTE. IN
VIEW FACT THAT APPROVED PID FOR SUBJECT PROJECT INCLUDES
FUNDS FOR SOCIO-ECONOMIC STUDIES OF MIXED FARM ENTERPRISES
(SEE P. 12 OF PID) AND IN VIEW FACT PP TEAM STILL IN FIELD
AID/W RECOMMENDS THAT THESE TWO STUDIES BE INCORPORATED
INTO PP FOR SUBJECT PROJECT AND FULLY JUSTIFIED IN SEPARATE
TECHNICAL ANNEX. PRESENTATION IN SEPARATE ANNEX TO PP WILL
FACILITATE AID/W CONSIDERATION OF PRE-FUNDING FROM FY 1978
PM AND P BUDGET (625-0929). GUIDANCE FOR DEVELOPMENT OF
DETAILED JUSTIFICATION FOR THESE STUDIES FOLLOWS BELOW.

2. OBJECTIVES OF CARRYING OUT PROPOSED RESEARCH SHOULD BE
MORE FULLY DESCRIBED. RESEARCH AND METHODOLOGY SHOULD BE
DESIGNED TO ADDRESS RELEVANT VARIABLES RELATED NOT TO JUST
MIXED FARMING SYSTEMS BUT ALSO TO BROADER RANGE OF DEVELOP-
MENT POSSIBILITIES AND OPTIONS INCLUDING PLANNED DEVELOP-
MENT OF IRRIGATED AGRICULTURE WHICH STANDS HIGH ON GOTG
DEVELOPMENT AGENDA. SCOPE OF PROPOSED RESEARCH SHOULD BE
DESIGNED SO AS TO BUILD ON RESEARCH BEING CARRIED OUT
THROUGH MULTI-DONOR GAMBIA RIVER BASIN ASSISTANCE PROGRAM.
CONSIDERATION SHOULD BE GIVEN TO THE OPTION OF HAVING
RESEARCH DONE UNDER CONTRACT(S) WITH ONE ORGANIZATION
AS TO REDUCE COSTS AND, PERHAPS, NUMBER OF FIELD AND
HOME OFFICE SUPPORT STAFF REQUIRED.

4. USE OF GAMBIAN PROFESSIONALS AND STUDENTS SHOULD BE MAX. IZED. AID/W FEELS STRONGLY THAT THIS RESEARCH SHOULD NOT BE USED ONLY AS TOOL FOR FINANCIN; PHD-LEVEL FIELD WORK BY U.S. OR OTHER DONOR COUNTRY GRADUATE STUDENTS. TRAINING OPPORTUNITIES AT PROFESSIONAL LEVEL SHOULD IN INCLUDED IN THE PROPOSAL FOR GAMBIAN PERSONNEL TO BE ASSOCIATED WITH STUDY.

5. IN KEEPING WITH PARAS. 2.D. AND E. OF REF. -, RESEARCH SHOULD BE FULLY INTEGRATED WITH ACTIVITY DESCRIBED AS COMPONENT SIX IN PID; QUOTE STRENGTHENING MINISTRY PLANNING AND EVALUATION CAPACITY UNQUOTE. IN OTHER WORDS, THIS RESEARCH SHOULD ASSIST IN ESTABLISHING A SYSTEM IN THE GAMBIA FOR CONTINUAL GENERATION OF DATA TO BE INCORPORATED INTO THE RURAL DEVELOPMENT PLANNING PROCESS. THUS, THE REPORT TO BE ISSUED 24 MONTHS FOLLOWING INITIATIN OF RESEARCH WOULD MERELY BE ONE IN A SERIES OF REPORTS CONCERNING AN ON-GOING DATA COLLECTION AND ANALYSIS ACTIVITY.

6. U.S. TECHNICIANS ARE ALREADY PROGRAMMED FOR THE SUMU P ECT (635-0202) AND ARE BEING PLANNED FOR THE REFOREST- A N PROJECT AND THE GAMBIA RIVER BASIN MULTI-DONOR ASSIST A PROGRAM AS WELL AS FOR THE SUBJECT PROJECT. ADVANTAGE SHOULD BE TAKEN OF THEIR PRESENCE TO ASSIST WITH THE RESEARCH DESIGN AND EXECUTION SO AS TO MINIMIZE THE REQUIREMENTS FOR ADDITIONAL EXPATRIATE TECHNICAL ASSISTANCE.

7. METHODOLOGICAL FRAMEWORK SHOULD INCLUDE AT MINIMUM-- OBJECTIVES, GUIDELINE (TERMS OF REFERENCE) SAMPLING FRAME, TYPE SURVEY INSTRUMENT AND USE OF ANALYSES AND BUDGET.

8. ANNEX SHOULD ADDRESS DESIRED QUALIFICATIONS OF PRINCIPAL RESEARCHERS AND IDENTIFY SOURCES, PREFERABLY GAMBIAN, OF THOSE PERSONNEL. VANCE
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PROPOSAL FOR GRANT AGREEMENT FOR RESEARCH PROJECT COVERING THE GAMBIA SECTOR OF THE GAMBIA RIVER BASIN

Banjul, The Gambia
June 1978

ANNEX S.

BIBLIOGRAPHY

Anderson, Roice H., Miller, Raymond W., Stutler, R. Karn, Irrigation Pilot Projects for Vegetable Production in the Gambia River Basin, Utah State University, Logan: April 1977

Bartha, Reinhold, Fodder Plants in the Sahel Zone of Africa, Weltforum Verlag, Munchen: 1970

Berg, Elliot: The Recent Economic Evolution of The Sahel; Center for Research on Economic Development, University of Michigan, Ann Arbor: June 1, 1975

Bradley, M., The Irrigation System at Sapu Agricultural Station: Proposals to Expand the Existing Network, Technical Paper Series No. 2, Rural Development Project, Ministry of Agriculture and Natural Resources, Department of Hydrometeorological Services, Sapu: November 1977

Bremaud, O., Beck, K., Nissen, N. and Vindrinet, R., Animal Health in The Gambia, Analyses of the Existing Animal Health Services and Proposals Concerning their Improvement, Deutsche Gesellschaft fur technische Zusammenarbeit and Fonds d'Aide et do Cooperation, Paris: May 1976

Central Bank of The Gambia Annual Report 1973/74; The Government Printer, Banjul: 1974

Central Bank of The Gambia, Annual Report, June 30, 1975, The Government Printer, Banjul: 1975

CILSS/Club Du Sahel Transport and Infrastructure Working Group: Road Maintenance Diagnostic Study for The Sahel, Draft Final Report, Volume 3 The Gambia; Louis Berger International, Inc., East Orange: July 1977

CILSS/Club Du Sahel Working Group on Marketing, Price Policy and Storage, Marketing, Price Policy and Storage of Food Grains in the Sahel, A Survey; Volume I: Synthesis with Statistical Compilation and Annotated Bibliography; Center for Research on Economic Development, University of Michigan, Ann Arbor: August 1977

CILSS/Club Du Sahel Working Group on Marketing, Price Policy and Storage, Marketing, Price Policy and Storage of Food Grains in the Sahel, A Survey; Volume II: Country Studies, Center for Research on Economic Development, University of Michigan, Ann Arbor: August 1977

Cleave, John H., African Farmers: Labor Use in the Development of Smallholder Agriculture, Praeger, New York: 1974

Collinson, M.P., Farm Management in Peasant Agriculture: A Handbook For Rural Development Planning in Africa, Praeger, New York: 1972

Colonial Advisory Council of Agriculture, Animal Health and Forestry, The Indigenous Cattle of the British Dependent Territories in Africa, Colonial Office Publication No. 5, Her Majesty's Stationery Office, London: 1957

Coulomb, J., La Race N'Dama: Quelques caracteristiques zootechniques, In: Rev. Elev. Med. Vet. Pays Trop., IEMVT 29 (4), Paris: 1976, pp. 367-380

Crowder, L.V. and Chheda, H.R., Forage and Fodder Crops, In: Food Crops of the Lowland Tropics, Oxford University Press, London: 1977

Department of Agriculture, Annual Reports 1970/71, The Government of The Gambia, Banjul, The Gambia: 1971

Department of Agriculture, Funding Package Deal Programme 1979-83 Department of Agriculture, Government of The Gambia, Abuko: 24th January 1978

Delgado, Christopher L., Economic Interactions Between Peasants and Herders In The West African Savannah: A Case Study From Tenkodogo, Upper Volta, Center For Research On Economic Development, University of Michigan, Ann Arbor, Michigan: September 1977

Dunsmore, J.R., Rains, A. Blair, Lowe, G.D.N., Moffatt, D.J., Anderson, I.P., and Williams, J.B.: The Agricultural Development of The Gambia: An Agricultural, Environmental and Socioeconomic Analysis, Land Resource Study 22, Land Resources Division, Ministry of Overseas Development, Surrey, England: 1976

Dunsmore, J.R., and Rains, A. Blair: The Land Resources of The Gambia and their Development, Volume I, A Review of Agriculture, Forestry and Livestock, and Proposals for their Development, Section A; Land Resources Division, Ministry of Overseas Development, Surrey, England: 1975

Dunsmore, J.R., Rains, A. Blair, Lowe, G.D.N., Moffatt, D.J., Anderson, I.P., and Williams, J.B.: The Land Resources of The Gambia and their Development, Volume I, A Review of the Land Resources and their Proposed Development, Section B; Land Resources Division, Ministry of Overseas Development, Surrey, England: 1975

Dunsmore, J.R., Rains, A. Blair, and Lowe, G.D.N.: The Land Resources of The Gambia and their Development, Volume I, A Review of Agriculture, Forestry and Livestock, and Proposals for their Development, Section C. Recommendations; Surrey, England: 1975

Eriksen, John, Livestock Development: Gambia River Basin, United Nations Multi-donor Mission to the Gambia River Basin, New York: April 1978

Eriksen, John, Summary Report, REDSO Livestock Seminar, August 22-26, 1977, Abidjan, Ivory Coast: 1977

FAO, Les Systemes Pastoraux Saheliens, FAO, Rome: 1977

Government of The Gambia, A Brief Description of STABEX (Lome Convention) with reference to The Gambia, Position Paper No. 4, Banjul: May 1978

FAO, Tropical Feeds, FAO, Rome: 1975

FAO, Types and Breeds of African Cattle, FAO, Rome: 1957

Gamble, David P., The Wolof of Senegambia, Ethnographic Survey of Africa: Western Africa, Part XIV, International African Institute, London: 1967

Government of The Gambia, 1977/78 Cattle Census, Department of Animal Health and Production, Ministry of Agriculture and Natural Resources, Banjul: 19

Government of The Gambia: Department of Agriculture Annual Report: 1970/71, Banjul: 1971

Government of The Gambia: Department of Agriculture Annual Report: 1971/72, Banjul: 1972

Government of The Gambia, Development Expenditure 1975/76, The Government Printer, Banjul: 1976

Government of The Gambia: Education Statistics 1975/76, Central Statistics Division, Ministry of Economic Planning and Industrial Development, Banjul: August, 1976

Government of The Gambia: Estimates of Recurrent Revenue and Expenditure, 1976/77, with the Five Year Development Plan 1975/76 - 1979/80, Annual Plan 1976/77, Government Printer, Banjul: 1977

Government of The Gambia, Estimates of Recurrent Revenue and Expenditure 1977/78 with the Five Year Development Plan 1975/76-1979/80: Annual Plan 1977/78, The Government Printer, Banjul: 1977

Government of The Gambia, Explanatory Notes On Other Charges Votes 1978/79, Department of Animal Health and Production, Ministry of Agriculture and Natural Resources, Abuko: 1978

Government of The Gambia, Five Year Plan for Economic and Social Development 1975/76 - 1979/80: Annual Plan 1976/77, The Government Printer, Banjul: 1976

Government of The Gambia, The Formulation of a Preparation Report for Phase II of the Rural Development Project Scheduled for Implementation between 1980 and 1984, Coordinator's Office, Rural Development Project, Ministry of Agriculture and Natural Resources, Banjul: May 1978

Government of The Gambia, Ministry of Agriculture and Natural Resources: Feasibility Study of Jakhally and Patcharr Swamps, Phases 1 and 2,: Interim Report, Volume I: Text; Louis Berger International, Inc., Dakar, Senegal: October 1977

Government of The Gambia, Ministry of Agriculture and Natural Resources: Rural Development Programme, Phase II: Programme Review, Banjul: 12 January

Government of The Gambia: Population Census 1973, Statistics for Settlements and Enumeration Areas, Volume I: Population; The Central Statistics Division, President's Office, Banjul: June 1974

Government of The Gambia: Population Census 1973, Statistics for Settlements and Enumeration Areas, Volume II: Housing; The Central Statistics Division, President's Office, Banjul: June 1974

Government of The Gambia: Population Census 1973, Statistics for Local Government Areas and Districts, Volume III: General Report; The Central Statistics Division, Ministry of Economic Planning and Industrial Development, Banjul: July 1976

Government of The Gambia: Report of the Civil Service Salaries Commission 1974-75, Volume I, The Government Printer, Banjul: July 31, 1975

Government of The Gambia, Report of the Civil Service Salaries Commission 1974-75, Volume 2, The Government Printer, Banjul: June 30, 1975

Government of The Gambia: Quarterly Survey of Employment and Earnings First Quarter 1975; The Central Statistics Division, Ministry of Economic Planning and Industrial Development, Banjul: June 1976

Hendy, C.R.C., Animal Production in Kano State and the Requirements for Further Study in the Kano Close Settled Zone, ODM/Land Resources Division, Surrey, England: 1977

Hewitt, William H., Land Resource Appraisal: Gambia River Basin, United Nations Development Program, New York: May 1977

Hubbard, Fred H., Report on a Development Programme to the Gambia River Basin; Natural Environment; Environment Health; Tourism, United Nations Multi-donor Mission, New York: March-April 1977

Huygen, Jean-Pierre, Development of the Gambian River Basin: A Forestry Study of the Basin; UNDP/New York: February-March 1978

IBRD, Appraisal of an Education Project in The Gambia; Projects Department, Western Africa Regional Office, Education Division, Abidjan: October 3, 1977

IBRD, Appraisal of an Education Project in The Gambia; Projects Department, Western Africa Regional Office, Education Division, Abidjan: April 5, 1978

IBRD, Appraisal of Rural Development Project The Gambia; Regional Projects Department, Western Africa Regional Office, Abidjan: June 2, 1976

FAO/IBRD, Draft Report of The Gambia Agricultural Development Project, Vol. 1, FAO, Rome: August 1975

IBRD, The Economy of The Gambia, Western Africa Region, Country Programs II, Abidjan: December 12, 1975

IBRD, Lugt, van der, Robert Jan E.M., RDP II Project Preparation; Regional Mission for Western Africa, Banjul: April 1978

IBRD, Project Performance Audit Report The Gambia: Agricultural Development Project (Credit 333-GM); Operations Evaluation Department, September 21, 1977, IBRD, Washington

IBRD, RDP II Project Preparation, Regional Mission For Western Africa, Banjul: 6 April 1978

IBRD, Planning RDP II Project Preparation, Regional Mission For Western Africa Banjul: 8 April 1978

IBRD, The Gambia: Second Agricultural Project, Livestock Component Identificat Abidjan Office Memorandum, Abidjan: 1974

IBRD, Report and Recommendation of the President of the International Development Association to the Executive Directors on a Proposed Development Credit to the Republic of The Gambia for an Education Project, IBRD, Washington: April 6, 1978

Institute for Agricultural Research, An Economic Survey of Three Villages In Zaria Province - Vol. 2 Input-Output Study Vol. i Text, Samaru Miscellaneous Paper 37, Ahmadu Bello University, Zaria, Nigeria: 1972

International Livestock Centre For Africa, Small Ruminant Production in the Humid Tropics, ILCA/PC/5, ILCA, Addis Ababa: 20 December 1977

International Monetary Fund, The Gambia - Recent Economic Developments, IMF, Washington, D.C.: 19 June 1974

International Monetary Fund, The Gambia - Recent Economic Developments, IMF, Washington, D.C.: March 5, 1976

Jones, R.G.B.: Report on A Soil and Water Conservation Consultancy: Republic Of The Gambia October/November 1975, Land Resource Report Number 12, Land Resources Division, Surrey, England: 1976

Kelly, C.W., Livestock Marketing Board: Outline Marketing Plan - 1977, Livestock Marketing Board, Banjul, The Gambia: 28 April 1977

Kingsland, James, A Gambian Chieftaincy Election, In: Journal of African Studies, Cambridge University Press, London: 1977

Lauer, J.J., Rice in the History of the Lower Gambia-Geba Area, Master of Arts Thesis, University of Wisconsin, Madison: 1969, unpublished

Lines, G.E., Working Paper For Livestock Development Programme, UNDP, Banjul: 1975

Lowe, G.D.N.: The Land Resources of The Gambia and their Development, Volume 3, Rural Society and the Economics of Agricultural Development; Land Resources Division, Ministry of Overseas Development, Surrey, England: 1975

Lugt, van der, Robert Jan E.M., Preparation of Second Phase Rural Development Program; Banjul: April 12, 1978

Madawela, Dudley: Human Resources in The Gambia; A Supporting Document for "Report on a Development Programme for the Gambia River Basin", United Nations Development Programme, New York: March-April 1977

McDowell, R.E., Feed Resources on Small Farms, Paper presented Seminar on "The Improvement of Farming Systems", Bamako, Mali: 20 February-1 March

McDowell, R.E., Improvement of Livestock Production in Warm Climates, W.H. Freeman and Company, San Francisco: 1972

McDowell, R.E., Steps Necessary in Effective Planning and Evaluation of Genetic Improvement of Tropical Livestock, Paper Presented International Conference on "Cattle Production in the Humid Tropical Zone", IEMVT, Bouake, Ivory Coast: December 12-18, 1976

McDowell, R.E., The Goat As a Producer of Meat, Department of Animal Science, Cornell University, Ithaca, New York: November 1977

Ministry of Agriculture and Natural Resources, Minutes of PCC Meeting held on 14 March 1978, Projects Coordinating Committee

Moffatt, D.J., Anderson, I.P., and Williams, J.B.: The Land Resources of The Gambia and their Development, Volume 2, The Physical Environment, Section A, Land Resources Division, Ministry of Overseas Development, Surrey, England: 1975

Moll, Heink A.J., Economic Analysis: Gambia River Basin Development, Multidonor Mission to the Gambia River Basin, United Nations Development Programme, New York: April 1977

Morse, Elliott R., Hatch, John K., Mickelwait, Donald R., Sweet, Charles F.: Strategies for Small Farmer Development: An Empirical Study of Rural Development Projects, Volume I., Final Report; Development Alternatives, Inc., Washington, D.C.: May 1975

Morse, Elliott R., Hatch, John K., Michelwait, Donald R., Sweet, Charles F.: Strategies for Small Farmer Development: An Empirical Study of Rural Development Projects, Volume II, Cast Studies; Development Alternatives, Inc., Washington, D.C.: May, 1975

National Academy of Sciences, Nutrient Requirements of Domestic Animals: Number 4, Nutrient Requirements of Beef Cattle, Fourth Revised Edition, Washington, D.C.: 1970

Natinnal Academy of Sciences, Nutrient Requirements of Domestic Animals: Number 5, Nutrient Requirements of Sheep, Fifth Revised Edition, Washington, D.C.; 1975

Norman, D.W., Economic Analysis of Agricultural Production and Labour Utilization Among Hausa in the North of Nigeria, African Rural Employment Paper No. 4, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan: January 1973

Norman, D.W., Methodology and Problems of Farm Management Investigations: Experiences From Northern Nigeria, African Rural Employment Paper No. 8, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan: 1973

Norman, H.D., Dr., Saker, G., Dr., McDowell, R.E., Dr.: Comments on Project Proposal for The Gambia, Ithaca: 1978

O.M.V.S., Environmental Program for the Integrated Development of the Senegal River Basin, Terms of Reference: Dakar: April 1975

Openshaw, K., The Gambia: A Wood Consumption Survey and Timber-trend Study, ODM/Land Resources Division, Tolworth, Surbiton, England: 1973

Parker, I.S.C., Prospects for Wild Life Conservation in The Gambia: A Consultant Report to the Foreign and Commonwealth Office Overseas Development Administration's Project for a Land Resource Survey of The Gambia, Wildlife Services Ltd., Nairobi, Kenya: January 1973

Percival, D.A.: The Common Trees and Shrubs of The Gambia, Banjul: 1968

Pierce, Phillip C., Environmental Program for the Integrated Development of the Senegal River Basin, Annex D, Plant and Animal Life Aspects, U.S. Army Corps of Engineers, Wash. D.C.: April 1975

Rains, A. Blair, Land Resources of Central Nigeria: Rangeland and Livestock Production, ODM/Land Resources Division Report No. 18, Surrey, England: 1978

Rains, A.B., Report on Surveys of Cattle Owners and Herdsmen in The Gambia, Miscellaneous Report # 180, ODM/Land Resources Division, Surrey, England: 1975

Reilly, P.M., Publications and Unpublished Reports of the Land Resources Division: Ministry of Overseas Development, Land Resources Division, Tolworth Tower, Surbiton, Surrey, England: 1977

Rural Development Project, Minutes of Meeting held on 17 January 1978, Projects Coordinating Committee

Sands, Michael and McDowell, R.E., The Potential of the Goat For Milk Production in the Tropics, Department of Animal Science, Cornell University, Ithaca, New York: February 1978

Rural Development Project/Ministry of Agriculture and Natural Resources, Preparation of Second Phase Rural Development Program, Banjul: 12 April 1978

Sarniguet, J., Mieulle, J.E., and Blanc, P.: Meat Supplies in West Africa, Part One, Analysis of the Present Situation and Prospects for the 1975-1985 Period in the Six Countries of the Region; SEDES, Paris: Feb. 19

Sarniguet, J., Mieulle, J.E., and Blanc, P.: Meat Supplies in West Africa, Part Two, Regional Study: Production Consumption and Marketing; SEDES, Paris: February 1973

Sarniguet, J., Mieulle, J.E., and Blanc, P.: Meat Supplies in West Africa, Part Three, Regional Forecasts and Proposals for Meat Supplies in West Africa; SEDES, Paris: March 1973

Sjoberg, Karl-Erik and Persson, Sven, Cattle Production in Africa, Rural Development Studies No. 2, Rural Development Section and Department of Animal Breeding, College of Agriculture, Uppsala, Sweden: March 1974

Snow, W.F., Consultancy on Tsetse Fly Distribution and Ecology in the Gambia Undertaken by W.F. Snow November 17th - December 21st 1975, FAO, Rome: 1976

Spencer, Dunstan S.C., Micro-Level Farm Management and Production Economics Research Among Traditional African Farmers: Lessons From Sierra Leonne, African Rural Employment Paper No. 3, Department of Agricultural Economics, Michigan State University, East Lansing, Michigan: September 1972

Tileston, Fred M., and Nelson, Gary, Irrigation: "A Paradox for Sahelian Development", REDSO/WA, Abidjan: March 3, 1977

Uchupi, Elazar, Emery, K.O., Bowin, C.O., and Phillips, J.D., The Continental Margin off Western Africa: Senegal to Portugal, Woods Hole Oceanographic Institution, Woods, Hole, Massachusetts: September 1975

UNDP, Consolidated Report On Development Assistance: The Gambia 1976-1977, Banjul: May 1978

UNDP: Development of the Gambia River Basin, Multidisciplinary Mission, Multi-donor Mission, March-April 1977, Programme of Action (DRAFT)

UNDP, Development of the Gambia River Basin: Multi-disciplinary mission, Multi-disciplinary mission, Multi-donor Mission, March-April 1977, Definition of Options, Matrices-Notice, Annex 1; October 15, 1977

UNDP, Etudes Hydrologiques et Topographiques Du Bassin Du Fleuve Gambie, Rapport Terminal TOME 5; Cartes Hydrographiques Fleuve Gambie: Banjul a Gouloumbo; Howard Humphreys & Sons, England, July 1974

UNDP, Hydrological and Topographical Studies of the Gambia River Basin, Final Report Volume 1, Main Report, Howard Humphreys & Sons, Reading, England: July 1974

UNDP, Hydrological and Topographical Studies of the Gambia River Basin, Final Report Volume 2, Appendices to Main Report, Howard Humphreys & Sons, Reading: England, July 1974

UNDP, Hydrological and Topographical Studies of the Gambia River Basin, Final Report, Volume 3, Report on the Continental Basin, Howard Humphreys & Sons, Reading, England: July 1974

UNDP, Hydrological and Topographical Studies of the Gambia River Basin, Final Report, Volume 4, Appendices to the Report on the Continental Basi Howard Humphreys & Sons, Reading, England: July 1974

UNDP, Hydrological and Topographical Studies of the Gambia River Basin, Final Report Volume 6, The Gambia Provinces Groundwater Study, Howard Humphreys & Sons, Reading, England: May 1974

USAID, Agricultural Development Policy Paper, USAID, Washington, D.C.: June 1978

USAID, Development Assistance Program: The Gambia, April 1977

USAID, Gambia Basin Development Project Paper, Washington, D.C.: 1977

USAID, Gambia Soil and Water Management Project Paper, Washington, D.C.: 1977

USAID, Niger Range and Livestock Project Paper, Washington, D.C.: 1977

USAID, Project Identification Document: Gambia Mixed Farming and Resource Management, FY 79-83, Abidjan, 1978

U.S. Department of Agriculture, National Range Handbook Notice-1, Soil Conservation Service, Washington: July 13, 1976

van Raay, Hans G.T., Fulani Pastoralists and Cattle, I.S.S. Occasional Papers No. 44, Institute of Social Studies, The Hague, Netherlands: May 1974

VRUGT ter, J.H.R.: Agricultural Development Project Annual Report: 1975, Research on Rice, Annex - Tables, Sapu: April 1976

Wagneur, Willy, Developpement Du Bassin Du Fleuve Gambie: Etude Agricole De La Partie Senegalaise Du Bassin, UNDP, New York: February-March 1976

Weil, Peter M., Political Structure and Process Among the Gambia Mandinka: The Village Parapolitical System, In: Papers on the Manding, Editor: Carleton T. Hodge, Indiana University, Bloomington and Mouton and Co., The Hague, The Netherlands: 1971

Weil, P., The Introduction of the Ox Plow in Gambia, In: African Food Production Systems; Ed: P.M. McLoughlin, The Johns Hopkins Press, Baltimore: 1968

Winrock Report, Potential of the World's Forages For Ruminant Animal Production, Winrock International Livestock Research and Training Center, Morrilton, Arkansas: September 1977

Winrock Report, Ruminant Products: More Than Meat and Milk, Winrock International Livestock Research and Training Center, Morrilton, Arkansas: September 1977

Zalla, Tom, Diamond, Ray B. and Mudahar, Mohinder S., Economic and Technical Aspects of Fertilizer Production and Use in West Africa; Dept. of Agricultural Economics, Michigan State University, East Lansing: September 1977