6490112 (2)
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260p

Somalia Agricultural Delivery Systems

Project Paper

Agency for International Development
Washington, D.C. 20523

1

ACTION MEMORANDUM FOR THE ASSISTANT ADMINISTRATOR FOR AFRICA

FROM : AFR/DR; John W. Koehring

SUBJECT: Somalia - Agricultural Delivery Systems Project (649-0112)

Problem: Your approval is required to execute a grant of $1,500,000 from FAA Section 103 (Agriculture, Rural Development, and Nutrition) to the Government of Somalia (GSDR) for the Agricultural Delivery Systems Project and to authorize a life-of-project funding of $7,752,000.

Discussion:

A. Project Description: The goal of the project is to reduce Somalia's dependence upon imported grains and, in so doing, to increase the well-being of the rural population. This purpose will be accomplished by revitalizing the National Extension Service so that improved technologies can be delivered to farming families in Somalia.

The project is part of a multi-donor (African Development Fund, European Economic Community, and International Bank for Reconstruction and Development) program to provide technical assistance, training, schools, and commodities for the National Extension Service (NES) and the Farm Management and Extension Training Center (FMETC). AID's principal contributions will include technical assistance, commodities and training for the NES and the FMETC.

Although a farm extension service exists on paper, the past emphasis by the government on large, state owned farms has weakened the link between extension and the small farmer. The field extension staff is limited in numbers and unskilled in practical, production-oriented experience. Due, in part, to the severe drought of 1973-1975 the GSDR has reconstructed their development plan to emphasize cereal production and thus avoid the short-falls in grain reserves which have resulted in hunger and starvation in the past. Small subsistence farms account for 80% of the cereals and oilseed production of the country; there is good evidence that this production could be increased dramatically by transferring dry-land farming techniques and technology from the schools and research stations to the farmer. The single most important constraint to this technology transfer has been the lack of trained manpower to work at the village level.

The project will address this constraint through three major avenues.

1. Revitalization of the National Extension Service under the Ministry of Agriculture. The project will establish a pyramidal system with field extension officers at the base who will work with farmers at the village level. Their work will be monitored by district officers who in turn will be supervised by regional extension officers. The NES will conduct ongoing retraining and skills upgrading at two regional training centers. It is estimated that 360 new field extension officers will be drawn from the FMETC graduates to establish the proposed ratio of one field extension officer to 500 families.

2. Establishment of a Farm Management Extension Training Center. To meet the need of new field extension officers as well as to upgrade existing staff, farm management extension training centers will be established to provide initial classroom instruction. AID will provide the technical assistance while the other donors will finance the infrastructure. The training centers will be responsible for providing training at the professional level for senior field administrators and at the technical level for district and farm extension agents. The curriculum will emphasize farm management principles as well as crop and animal production techniques. To complement the academic training at the centers, a school farm will be established where all students serve an internship. Both the National Extension Service and the Farm Management Advisory Service will employ graduates from the training centers.

3. Formulation of a National Agricultural Research Policy. At present, much agronomic information is available for transmission to farmers. Future dry-land crop research policy will be formulated on a feed-back system which responds to the problems of the farmers as related by field extension officers. It will be a two-way transfer of information.

B. Financial Analysis

The total cost of the multi-donor project is $32.44 million. AID's share of the inputs at $7.75 million is equivalent of 24% of the total project cost. AID's contribution will be distributed in the following manner:

Technical Assistance	$ 3,351,000
Training	866,000
Commodities	1,370,000
Other Costs	2,165,000
Total	**$ 7,752,000**

It is estimated that 97% of AID's contribution will finance foreign exchange costs. The GSDR is contributing $3.8 million in salaries, taxes, etc., in addition to nearly 1,000 hectares of land and buildings in kind. The other major donors include the World Bank ($10.5 million), the African Development Fund ($8.8 million) and the European Economic Community ($1.5 million).

C. Social, Economic, Technical and Environmental Description

1. Social Soundness: The project has been judged to be socially sound. Past involvement of the Wyoming team in the 1960's produced good results and an enduring response in the dryland farming areas of Somalia. Many women are enrolled in the Agricultural Secondary School and these students will provide a base for the recruitment of extension field staff.

2. Technical Analysis: No construction will be undertaken by AID. The budget cost estimates have been reviewed by the Project Committee and judged to be reasonably firm for purposes of FAA Section 611(a).

3. Environmental Analysis: The Initial Environmental Examination (IEE) stated that "The project per its design is intended to mitigate current environmental questionable practices, to up-grade knowledge and management, and boost the economy. These are all beneficial and as such an Environmental Assessment is not recommended." Pursuant to the above recommendation the IEE is included in this package for your approval of the negative recommendation.

4. Implementation: The project will be implemented by the Ministry of Agriculture. A Project Manager Unit (PMU) established and funded under the project will have administrative responsibility for implementation. The PMU will be staffed by a Somali project manager, an expatriate technical advisor to the Manager and an expatriate controller. Local accounting and administrative personnel will be drawn from the GSDR. Technical assistance will be provided under a contract with a U.S. university.

5. Committee Action and Congressional Apprisement: The Project Review met on Tuesday, June 26, 1979. There were no issues requiring the attention of an ECPR. The Project Review recommended approval of the project and that it move forward to authorization.

The project agreement will contain conditions precedent to ensure that the training farms and a demonstration state farm are available prior to disbursement of funds. Covenants will be included to ensure that the extension workers and others trained under the project will be employed in positions appropriate to their level of training.

The advice to Congress requesting funding of $1,500,000 for FY '79 was forwarded on July 10, 1979. The fifteen day waiting period expired on July 25, 1979.

6. The project paper recommends, and the authorization contains, a proprietary procurement waiver to permit purchase of 16 light project vehicles from a single U.S. manufacturer for standardization purposes. Your authority to approve such a waiver is contained in AID Handbook 15, Chapter 3.

7. The Christopher Working Group on Human Rights has reviewed this project and has raised no objections.

Recommendation: That you sign the attached IEE recommending a negative determination, approve the requested waiver and sign the attached PAF II thereby authorizing the proposed project.

Attachments: A. - PAF II

B. - Initial Environmental Examination

Clearances:
AFR/DR/EAP, MMcDaniel
AFR/DR/ENG, MJMorgan (Draft)
AFR/DR/SDP, BBoyd (Draft)
AFR/EA, HJohnson (Draft)
AFR/EA, RHynes (Draft)
GC/AFR, ESpriggs
AFR/DP, EDonoghue (Draft)
AFR/DR, NCohen
DAA/AFR, WHNorth

AFR/DR/EAP:SFee/MFoster:hrp:7/27/79:x28286

5

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

PART II

NAME OF COUNTRY : Somalia

NAME OF PROJECT : Agricultural Delivery Systems

NUMBER OF PROJECT : 649-0112

Pursuant to Part I, Chapter 1, Section 103 of the Foreign Assistance Act of 1961, as amended (the "Act"), I hereby authorize a Grant to the Somali Republic (the "Cooperating Country") of not to exceed One Million Five Hundred Thousand United States Dollars ($1,500,000) (the "Authorized Amount") to assist in financing certain foreign exchange and local currency costs of goods and services required for the project as described in the following paragraph.

The Project consists of a program to revitalize the National Extension Service in Somalia. A.I.D.'s contribution to this multi-donor (IDA, ADF, EEC, A.I.D.) project consists of providing the technical assistance, training and commodities required for the National Extension Service, the Farm Management and Extension Training Center, and two additional extension training centers. The purpose of the project is first to install a working extension service and secondly to provide properly trained staff to operate the extension service so that improved technologies can be delivered to small farmers in Somalia.

I approve the total level of A.I.D. appropriated funding planned for this Project of not to exceed Seven Million, Seven Hundred Fifty Two Thousand United States Dollars ($7,752,000), Grant, during the period FY 1979 through FY 1983, including the amount authorized above and additional increments of grant funding during that period, subject to the availability of funds and in accordance with A.I.D. allotment procedures.

I hereby authorize the initiation of negotiations and execution of the Project Agreement by the officer to whom such authority has been delegated in accordance with A.I.D. regulations and Delegations of Authority, subject to the following essential terms and covenants and major conditions, together with such other terms and conditions as A.I.D. may deem appropriate.

a. Source and Origin of Goods and Services

Except for Ocean Shipping, goods and services financed by A.I.D. under the project shall have their source and origin in the Cooperating Country or in the United States or in countries included in A.I.D. Geographic Code 941, except as A.I.D. may otherwise agree in writing. Ocean Shipping financed under the Grant shall be procured in the United States or in the Cooperating Country, except as A.I.D. may otherwise agree in writing.

b. Conditions Precedent

The Project Agreement shall contain a condition precedent providing in substance that prior to the first disbursement of funds under the Project, or to the issuance of any commitment documents with respect thereto, the Cooperating Country shall furnish in form and substance satisfactory to A.I.D. evidence that:

1. the 60 hectare training farm at Afgoi has been allocated to FMETC;

2. the 400 hectare demonstration state farm in Jannale has been allocated to the FMAS; and

3. the two additional state farms in Jannale have been made available for use by FMAS for the full duration of the Project.

c. Covenants

The Project Agreement shall contain covenants providing in substance as follows:

1. The Cooperating Country agrees:

(i) that the diplomas and certificates granted by the Afgoi Farm Management and Extension Training Center and the Extension Training Centers at Jannale and Bonka will be officially recognized as a basis for determining the grades and salaries of technicians holding them;

(ii) that these diplomas and certificates will allow their holders to accede to the position in the salary scale immediately above the one they occupied when they joined these institutions; and

(iii) that certificates for post-graduate training in the U.S., will be accepted and will allow their holders a salary equal to an equivalent diploma.

2. The Cooperating Country agrees to appoint the required Somali staff in time to meet the training and operational needs of the Project.

3. The Cooperating Country agrees to recruit for the Project international staff with qualifications and experience satisfactory to A.I.D.

4. The Cooperating Country agrees to submit a PMU training program by March 1980 for approval by A.I.D.

5. The Cooperating Country understands that A.I.D. does not undertake to finance construction costs under the Project, including overruns in the costs of construction financed by other donors or the Cooperating Country.

d. Waiver

The following waiver to A.I.D. regulations is hereby approved:

For reasons set forth on page 29 of the Project Paper and for purposes of standardization in accordance with A.I.D. Handbook 15, Chapter 3, A.I.D. formal procurement procedures are hereby waived to permit procurement of light passenger vehicles of U.S. manufacture from the supplier of vehicles for Project No. 649-0101.

7/27/79

Coler F. Butcher
Assistant Administrator
for Africa

INITIAL ENVIRONMENTAL EXAMINATION

Project Location: Somalia

Project Title: Agricultural Delivery Systems

Project Number: 649 - 0112

Funding (Fiscal Year and Amount): 1980 $1,500,000 Total $7,752,000

Life of Project: 5 Years

IEE Prepared By: Mission/McGowan **Date:** Dec 17, 197[illegible]

Environmental Action Recommended:

A negative determination is recommended.

Concurrence: Charles P. Campbell **Date:** 12/15/7[illegible]

Assistant Administrator's/Director's Decision: **Date:**

[illegible] 1/2 1/79

I. PROJECT DESCRIPTION

A.I.D. will participate as a major donor in a multidonor project designed to upgrade agricultural management, extension, and training as well as allied infrastructure, including agricultural research in Somalia. Principal project inputs will include technical assistance, formal and non-formal education, and the provision of teaching and support equipment.

Specifics include: 1) strengthening of the National Extension Service through training and introduction of new extension emphasis, 2) creation and operation of a Farm Management and Extension Training Center to produce practically oriented management and extension personnel, and 3) quantify, coordinate, and strengthen the national agricultural research strategy.

II. ENVIRONMENTAL CONSIDERATIONS

Land Use

The principal thrust of the project is the extension of agricultural information and practices into both the rainfed and irrigated areas of Somalia. Through the project's influence, there will be an increase in the intensity of agriculture production and thereby also in allied systems. Thus it is expected that shifts will occur in types of production creating an expansion of land under till. Such shifts and expansions will, in some part, be an indication of project success.

Through training received in the project, extnesion agents and managers will be able to intelligently guide expansion and control agricultural land use shifts. The project should consider some land use planning in the curricula, especially as it may relate to an urban/agricultural/ pastoral mix. Extension agents and farm managers have a unique chance to avoid many mistakes as they open new areas.

Increasing the Population

The project is expected to have no immediate effect on population. Long term effects from the project may result in some population shifts as new areas are farmed. The eventual increase in production and reduction in the risk avoidance posture will be seen as an increase in the health and welfare of the recipients. This in turn will affect their decision with respect to family planning.

Extracting Natural Resource

As information is developed and disseminated, and cropping patterns change, there will be a need for the replacement of soil nutrients The project intends to provide a sensitivity for such issues and as a consequence there should be no serious environmental problem.

Changing the Soil Character

The extension of management and technique will aid in returning the soil to a better agricultural state. Thus, the program will have a beneficial affect on this point.

Altering Natural Defenses

As with any other trend toward a mono culture, there are certain inherent problems. Nonetheless, with proper management and extension as per the program design, such can be minimized. The system would probably deteriorate rapidly without inputs arising from peoper management and extension.

Foreclosing Important Uses

The project's results should be seen in a reduction of such foreclosure.

Jeopardizing Man or His Works

Extension of proper information, based on sound training, as utilized by good management will be principles in eliminating such jeopardy - the project is designed in this way.

Water Quality

The use of water and the timing of crops are principal inputs to agricultural success and are issues to be covered in the training programs. Water quality in relation to rainfed lands relates to runoff. Water quality in irrigated agriculture is particularly affected by dissolved solids in both headgate and tail waters. The provision of soil and water conservation, as proper management tools, is expected to reduce both point and nonpoint source pollution. The salinity of water and its consequent affect on soils will be considered in the training programs. Use of agricultural chemicals, and the training preceeding such, must evaluate the various systems to assure adequate assimilation capacities

and any tendencies for pollution. The training programs will consider these problems and thereby instill within its students a sensitivity which may then be extended.

Atmosphere

Within the confines of an agricultural training and institutional setting there will be no excessive or adverse affect on the atmosphere. The program will instill in its students an appreciation of the various forms and causes of atmohpheric pollution arising from agricultural production, such as burning, dust, vaporization of pesticides, etc.

Cultural

Because the thrust of the project is to enhance the ability of the country to produce within the confines of low risk inputs, there should be no adverse cultural affect.

Natural Resources

Through the increased efficiency in utilization of water, some water otherwise lost to the surface drainage systems will be salvaged. This should substantially increase infiltration and reduce the silt load currently affecting both major drainage systems.

Scarce resources will be better utilized through more efficient cropping, harvesting, and storage systems. As efficiency increases, there should be a tendency to lessen encroachment into less satisfactory areas of the environment. This will be accomplished through an active extension and research program coupled with good management.

Socioeconomic

The program, per its design, will provide systems whereby some of the less desirable cultural traditions are replaced. The resultant product will be seen in an overall socioeconomic improvement.

Health

Much of the potential for agricultural production is lost because of inefficiency, lack of knowledge, or poor management capability. The program will provide mechanisms whereby these problems can be resolved. With greater production, many of the problems associated with low income and poor nutrition will be resolved.

Ultimately, as production intensifies, there will follow a need for such sophisticated tools as agricultural chemicals. The training components need to be cognizant of the ramifications which attend these tools. It is thereby recommended that the plant protection expert have the following qualifications: 1) Knowledge of human toxicological behaviours of agricultural chemicals in arid conditions, 2) be well versed in the practical aspects of workers' safety, 3) be capable of establishing or evaluating the appropriateness of medical controls for persons using or extending information on organo phosphates, carbamates, and some of the other more toxic materials including certain herbicides, 4) be knowledgeable about the environmental fate of the materials and their breakdown products, and 5) be aware of the affects of these tools on wildlife, non-target organisms and systems, including the tendencies to produce an increased rate of resistance in disease vectors.

General

Any international impact should be seen in the eventual move toward self-sufficiency in grain and other crop production. There are no controversial impacts of significance. Larger program impacts may accrue to the tie-in with other agriculturally related projects. This would be positive.

III. ENVIRONMENTAL RECOMMENDATION

The project per its design is intended to mitigate current environmentally questionable practices, to upgrade knowledge and management, and boost the economy. These are all beneficial and as such an Environmental Assessment is not recommended. Nonetheless, a competent environmental analysis should be undertaken of the curricula when it is being developed to assure consideration of concerns.

IMPACT IDENTIFICATION AND EVALUATION FORM

Impact Areas and Sub-areas 1/	Impact Identification and Evaluation 2/
A. LAND USE	
1. Changing the character of the land through:	
a. Increasing the population	M
b. Extracting natural resources	L
c. Land clearing	M
d. Changing soil character	M
2. Altering natural defenses	M
3. Foreclosing important uses	L
4. Jeopardizing man or his works	L
5. Other factors	
_____	_____
_____	_____
B. WATER QUALITY	
1. Physical state of water	M
2. Chemical and biological states	M
3. Ecological balance	M
4. Other factors	
_____	_____
_____	_____

1/ See Explanatory Notes for this form.

2/ Use the following symbols:
N - No environmental impact
L - Little environmental impact
M - Moderate environmental impact
H - High environmental impact
U - Unknown environmental impact

August 1[illegible]

C. ATMOSPHERIC

1. Air conditioner ---------- L-M
2. Air pollution ---------- L-M
3. Noise pollution ---------- L
4. Other factors

_____ _____

_____ _____

D. NATURAL RESOURCES

1. Diversion, altered use of water ---------- M
2. Irreversible, inefficient commitments ---------- L
3. Other factors

_____ _____

_____ _____

E. CULTURAL

1. Altering physical symbols ---------- M
2. Dilution of cultural traditions ---------- L-M
3. Other factors

_____ _____

_____ _____

F. SOCIOECONOMIC

1. Changes in economic/employment patterns ---------- M
2. Changes in population ---------- M
3. Changes in cultural patterns ---------- M
4. Other factors

_____ _____

_____ _____

G. HEALTH

1. Changing a natural environment ———— M
2. Eliminating an ecosystem element ———— L
3. Other factors

———— ————

———— ————

H. GENERAL

1. International impacts ———— M
2. Controversial impacts ———— L
3. Larger program impacts ———— M
4. Other factors

———— ————

———— ————

I. OTHER POSSIBLE IMPACTS (not listed above)

———— ————

———— ————

———— ————

See attached Discussion of Impacts.

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: Somalia

4. DOCUMENT REVISION NUMBER: 1

5. PROJECT NUMBER (7 digits): 649-0112

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

7. PROJECT TITLE (Maximum 40 characters): Agriculture Delivery Systems

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	C. L/C	D. TOTAL	LIFE OF PROJECT E. FX	F. L/C	G. TOTAL
AID APPROPRIATED TOTAL	1,500		1,500	7,543	209	7,752
(GRANT)	(1,500)	( )	(1,500)	(7,543)	(209)	(7,752)
(LOAN)	( )	( )	( )	( )	( )	( )
OTHER U.S. 1.						
OTHER U.S. 2.						
HOST COUNTRY		500	500		3,800	3,800
OTHER DONOR(S)	2,070	1,380	3,450	12,700	8,100	20,800
TOTALS	3,570	1,880	5,450	20,243	12,109	32,352

11. PROPOSED BUDGET APPROPRIATED FUNDS ($000)

A. APPROPRIATION	B. PRIMARY PURPOSE CODE	PRIMARY TECH. CODE C. GRANT	D. LOAN	E. 1ST FY 79 F. GRANT	G. LOAN	H. 2ND FY 80 I. GRANT	J. LOAN	K. 3RD FY 81 L. GRANT	M. LOAN
(1) FN	143	012	-	1,500	-	2,000	-	500	-
(2)									
(3)									
(4)									
TOTALS				1,500		2,000	-	500	-

A. APPROPRIATION	N. 4TH FY 82 O. GRANT	P. LOAN	Q. 5TH FY 83 R. GRANT	S. LOAN	LIFE OF PROJECT T. GRANT	U. LOAN
(1) FN	1,600	-	2,152	-	7,752	-
(2)						
(3)						
(4)						
TOTALS	1,600	-	2,152	-	7,752	-

12. IN-DEPTH EVALUATION SCHEDULED: MM 06 YY 81

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: Charles P. Campbell

TITLE: Mission Director, USAID/Somalia

DATE SIGNED: MM 05 DD 1 YY 79

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

AID 1330-4 (3-76)

AGRICULTURE DELIVERY SYSTEMS PROJECT PAPER

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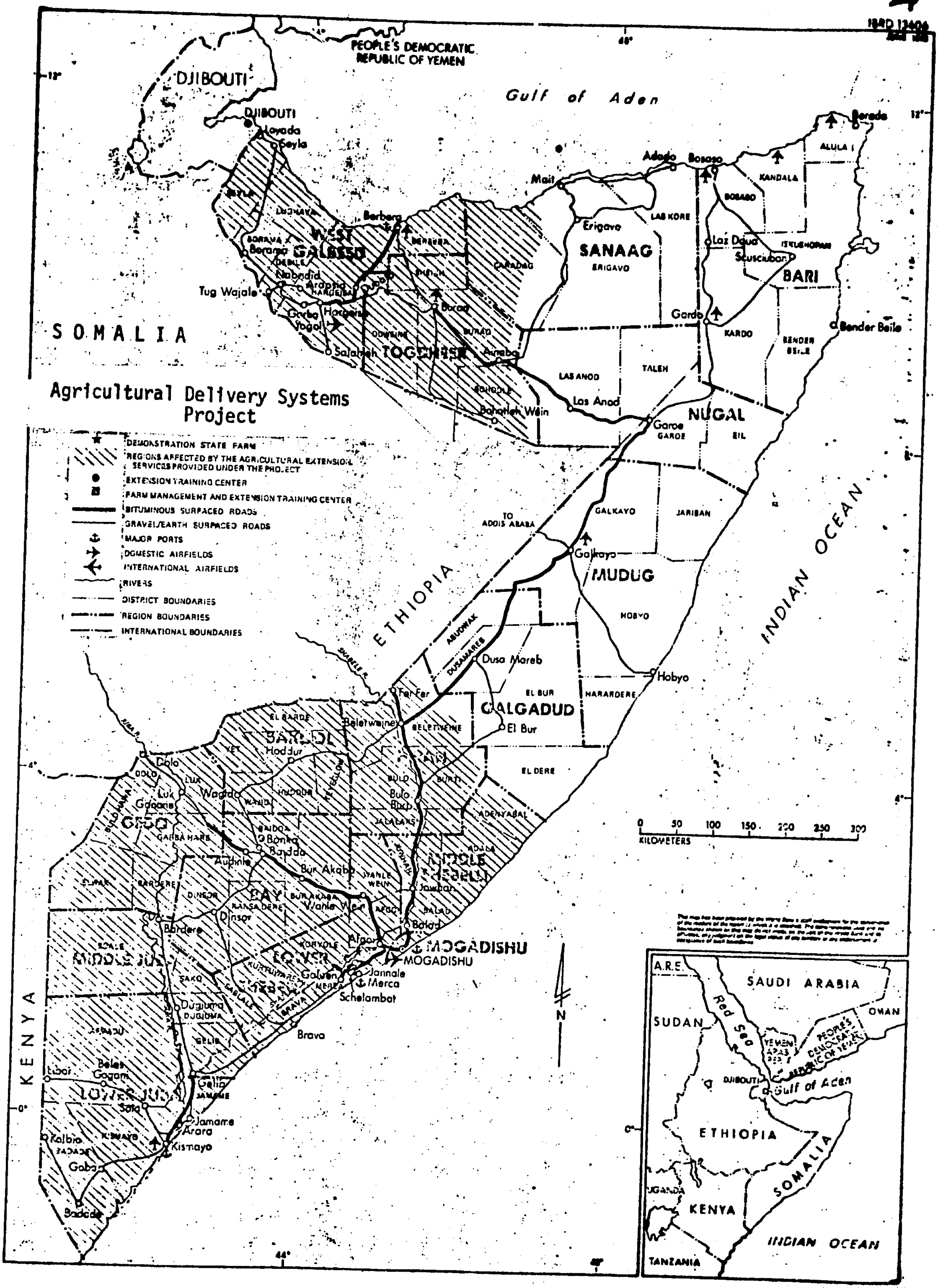
8. FMETC Analysis
9. Agronomic Analysis
10. Livestock Analysis
11. Economic Analysis
12. Financial Tables
13. Implementation
14. AIDE Memoire
15. IEE

AGRICULTURAL DELIVERY SYSTEMS

PROJECT TEAM DEVELOPMENT

Project Officer	-	G. Nelson USAID/S
Agricultural Officer	-	M. Lau USAID/S
Extension Specialist	-	C. Dennis Funk - Utah State
Agronomist	-	Max G. Long - Utah State
Livestock Specialist	-	Thomas D. Bunch - Utah State
Economist	-	N. Keith Roberts - Utah State


IBRD 13406
PEOPLE'S DEMOCRATIC REPUBLIC OF YEMEN
DJIBOUTI
Gulf of Aden
SOMALIA
Agricultural Delivery Systems Project
DEMONSTRATION STATE FARM
REGIONS AFFECTED BY THE AGRICULTURAL EXTENSION SERVICES PROVIDED UNDER THE PROJECT
EXTENSION TRAINING CENTER
FARM MANAGEMENT AND EXTENSION TRAINING CENTER
BITUMINOUS SURFACED ROADS
GRAVEL/EARTH SURFACED ROADS
MAJOR PORTS
DOMESTIC AIRFIELDS
INTERNATIONAL AIRFIELDS
RIVERS
DISTRICT BOUNDARIES
REGION BOUNDARIES
INTERNATIONAL BOUNDARIES
SANAAG
BARI
NUGAL
MUDUG
GALGADUD
ETHIOPIA
INDIAN OCEAN
KENYA
MOGADISHU
Berbera
Hargeisa
Borama
Burao
Erigavo
Las Anod
Garoe
Galkayo
Hobyo
Dusa Mareb
El Bur
Beletweine
Hoddur
Baidoa
Bardera
Jowhar
Balad
Afgoi
Merca
Brava
Jamame
Kismayo
Badade
KILOMETERS
0 50 100 150 200 250 300
A.R.E.
SAUDI ARABIA
SUDAN
Red Sea
OMAN
UGANDA
TANZANIA

PROJECT DESCRIPTION:

Background: Somalia, one of the 28 least-developed countries designated by the UN, is located on the Eastern Horn of Africa. A population of some 3.5 million reside in its 637,000 square kilometers. Over 80% of the population is directly involved in agriculture with some 40% being cultivators.

The economy of the country relies heavily on the primary sector, particularly agriculture and livestock. The mainstays of its exports have traditionally been livestock (74%), and bananas (16%). The country has been in a food deficit position for many years with food imports amounting to over 20% of the total imports.

Agriculturally, the potential for both expansion and intensification is great. At present, less than 1% of the potentially cultivable land is under cultivation. Yields are very low and technologies utilized are primitive. Over the past 10 years the small farmer segment has taken a back seat to capital intensive semi-industrialized agriculture undertaken on State farms. The government has now recognized this inbalance and is planning to devote greater resources to the small farmer segment.

The private sector in agriculture is dominated by small subsistence farms which, in aggregate, account for 80% of the cereals and oilseed production of the country. Typically, the private small farmers are producing for subsistence with a small marketable surplus to provide for purchased necessities.

The AID strategy in the sector, as defined in the CDSS, has been to address the needs of the sector in a multi-donor format to provide the means and the impetus for the government to effect its shift of emphasis back to the private, small farmer segment of the sector and to allow Somalia to achieve its goal of self sufficiency in food production. The multi-donor program addresses the constraints of the sector on two levels, direct production and in a wider institutional framework.

Due to climatic restraints, the primary production effort for cultivated crops is in the southern third of the country. The production programs begin in the interriverine area focussing on the Bay Region which is the area judged to have the highest productive potential. The ongoing project 649-0101, Agricultural Extension, Training and Research, is undertaking a pilot effort in the region and the multi-donor Bay Region Project, 649-0113, will expand the pilot program. A minimum level technology program has been defined for the area utilizing simple technologies and improved cultural practices, developed by the University of Wyoming under an early AID program in the 1960s, which have proven to give significant yield increases in the dryland areas.

Institutionally, the needs of the sector are great. With the emphasis over the past several years on Public Sector investments in large State farms, primarily on irrigated lands, the institutions relating to dryland agriculture on small farms became dormant. The Government's request for revitalization of these institutions was the genesis of the present project.

The Project

Table 1 is a graphic representation of the requirements for institutions to revitalize the small farmer segment of sector.

In its most basic state, the delivery system to be created must have three critical parts: a trained manpower base to deliver the technical package; an institution for supervising, coordinating, managing and supporting the extension agents; and a research arm to provide a constant stream of proven technologies for the system to pass to farmers. These three parts are, at present, only very rudimentary in Somalia. The project will focus on three institutions, the National Extension Services (NES), the Farm Management Advisory Service (FMAS), and the Farm Management Extension Training Center (FMETC). It is the purpose of this project to give these critical institutions the capability to provide the technical outreach in the agricultural sector.

In addition to the requirement for a delivery system, there are two other important components of the strategy to improve agricultural production, input supply and marketing, which are not being addressed by this project but which will be addressed in the regional development projects. The responsibility for input supply rests with the seed production unit of the Ministry of Agriculture which supplies seed and ONAT (the National Tractor Hiring Agency) which provides other inputs. Marketing is handled through the Agricultural Development Corporation.

National Extension Service

Delivery of technical information to farmers requires a large number of agents at the village level to work on a daily basis with farm families. The structure to be developed in the project is a classical pyramidal model with large numbers of minimally-trained agents supervised by a smaller number of better-trained district officers who are in turn supervised by a still smaller number of professionals at regional levels who are supported and supervised by a small cadre of specialists and professionals at the central level. Beyond the government structure, experience has shown that the final spread in the pyramidal model is the spread from initial adaptors or innovative farm families to the remainder of farms. This structure is presented schematically in Table 2. This type of structure economizes on the scarcest resource, trained manpower, by limiting the number of highly trained staff which are required.

TABLE 1

AGRICULTURE DELIVERY SYSTEM
Simplified Schematic

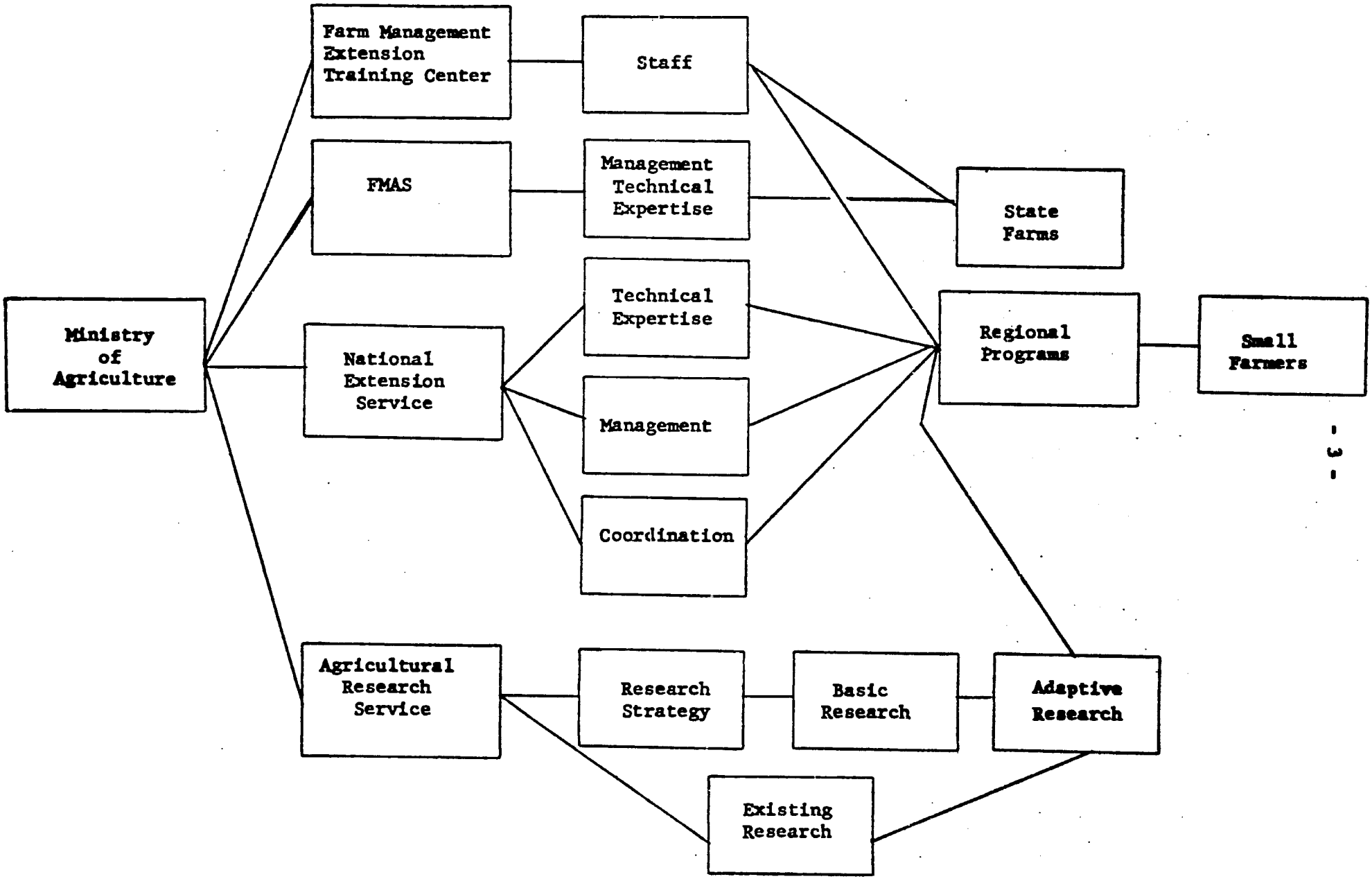
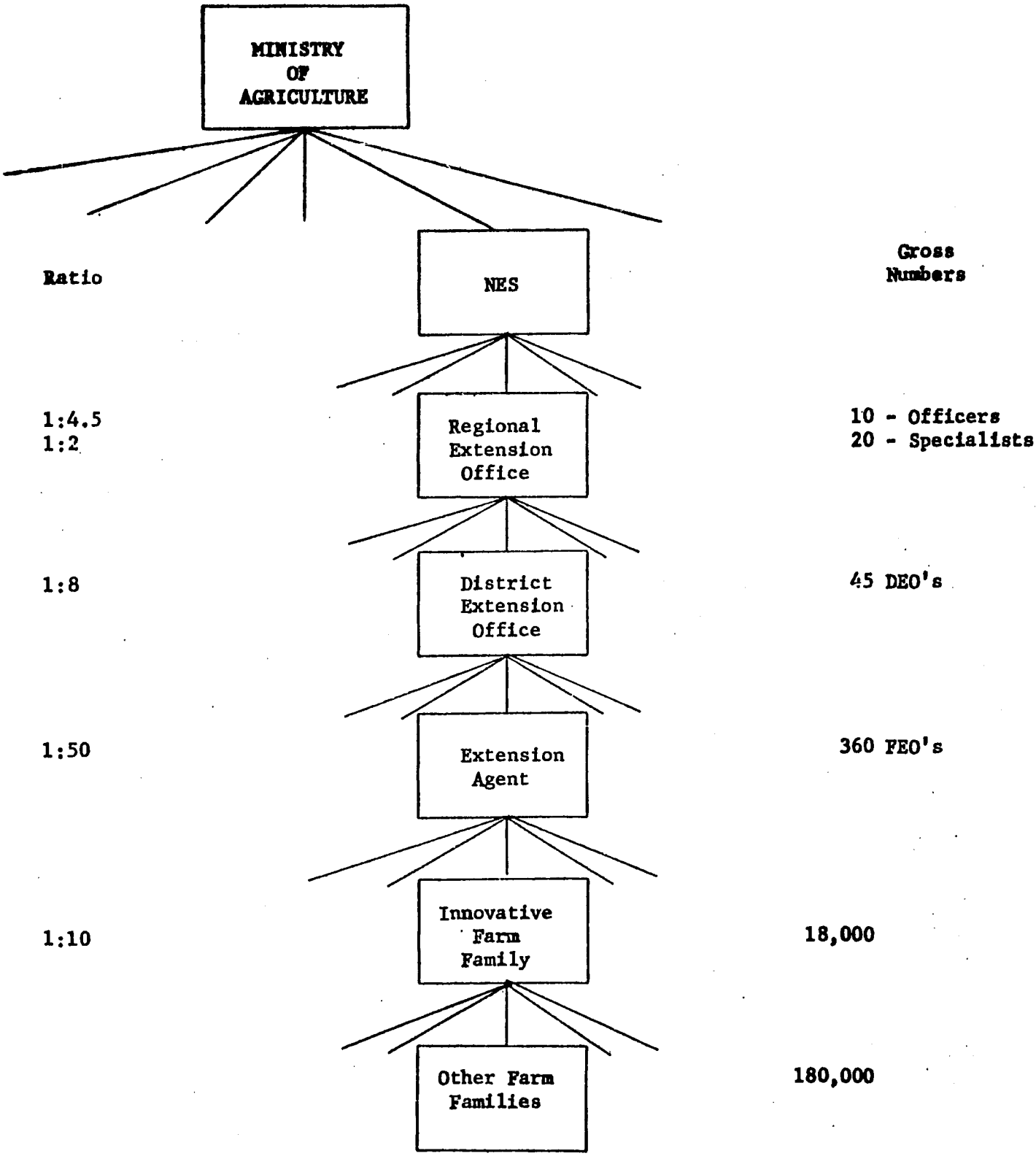


TABLE II

THE NATIONAL EXTENSION SERVICE



The crop production sub-sector, as it now exists, would need about 360 new Field Extension Agents (FEAs). Each FEA would serve about 500 families. This ratio of one FEA to 500 families takes into consideration the size and spread of cultivated holdings, the area an agent would have to cover, the present low level of technology on the average farm, and the level of technical competence that may be expected from an extension agent. This ratio is likely to improve as agriculture becomes more intensive and market oriented. FEAs would be supervised by District Extension Officers (DEOs) at the rate of one DEO per eight FEAs. This would enable each DEO to visit the area served by each of his FEAs once every two weeks at the rate of four touring days per week. He would check that the visits by FEAs were being carried out regularly and on schedule, and assist the FEAs and farmers in addressing technical matters. He would attend the training sessions with the regional subject matter specialists along with the FEAs. This type of work relationship between the FEAs and DEOs would obviate the need for formal reporting. FEAs would, however, be expected to maintain diaries of their activities which would be scrutinized and signed by the supervising DEO. The DEOs would find out whether the FEAs visits were being made as planned by making surprise visits and by asking farmers simple questions like the name of the FEA, the day fixed for his or her visits and whether his or her messages were being implemented in the fields. Once farmers had become aware of the FEA's visit schedule, they would themselves become effective supervisors.

The regional extension program would be headed by the Regional Extension Officer (REO) who would be assisted by two regional subject matter specialists, one for crop and on-farm animal production and one for plant protection. The subject matter specialists would provide on-the-job training for groups of DEOs and FEAs every two weeks, followed by technical guidance regarding their field work with farmers. The regional specialists would spend about one-third of their time briefing FEAs on the "message" to be delivered to farmers. Another third of their time would be spent on field visits with DEOs and FEAs, helping them solve specific technical problems and conducting and supervising crop trials and field demonstrations. The remainder of the specialists' time would be devoted to preparing the content of the "messages" and on visits to the local research station for an active, continuing, first-hand contact with research. The REO would involve the research scientists and the instructors at the ETCs in planning and conducting the regional training program and in developing training materials. The REOs, DEOs and regional subject matter specialists would, in tern, be brought together at the FMETC for a period of two days at the beginning of each month, for intensive training by the Farming System and Plant Protection Specialists based at Headquarters. Here again, these specialists would maintain close contact with the Central Research Station through regular and frequent visits and discussions and through the active involvement of the research scientists and the FMETC staff in the formulation of the extension messages to be delivered to farmers.

The extension effort would concentrate on the few important crops and a limited number of easily understood tasks to be implemented during the two-week period between FEA briefing sessions. The message would focus on those practices likely to bring the best economic results, while making optimum use of the farmers' available resources. A number of sound research recommendations and common sense answers to failures in the farming system are presently available for use by the Extension Service. The initial thrust would be towards improving the husbandry practices such as field preparation, sowing, weeding, and plant protection. The main concern in the early stages would be to ensure an even plant population in the fields at harvest time, which by iteslf would result in a substantial increase in yields. Improved management practices would be stressed, rather than the use of purchased inputs. Initial messages would aim at the effective use of this labor. Since low productivity is often the result of inappropriate elementary husbandry practices, simple technological improvements could be introduced quickly at this stage without waiting for the results of an elaborate, time consuming screening and trial process. Improvements in productivity could be achieved even with the improved use of traditional hand tools by farmers. Once yields and incomes could be made to increase in this way, so would the farmers' confidence in the extension service, hence making them receptive to further and more sophisticated messages. The extension service could thus, without delay, obtain an initial reaction which would ensure its continued acceptance. Once convinced of their capability to increase production through improved practices with the help of extension workers, farmers would be willing to adopt the use of more sophisticated inputs such as pesticides, new seed and crop varieties, ox ploughs, fertilizers (where applicable) and other improvements which would be identified and developed by a strengthened national research service.

In order to diffuse the know-how obtained by them at the bi-weekly training sessions, the FEAs would follow a fixed schedule of visits to farmers, at a fixed time and day through four days every week. The "clients" of a given FEA would be divided into eight groups. The FEA would visit two groups a day, one in the early morning and the other in the late morning. Evening sessions would be used for audio visual compaigns with programs developed by the NES and delivered by REO staff. He or she would attend the bi-weekly briefing sessions either at regional headquarters, or at the ETC on a fixed day, after having carried out two rounds of visits to farmers. The spare days would be used for make up visits and for solving problems encountered by farmers.

It would not be possible or necessary to attempt to reach all farmers directly through extension work in the field. The FEA would identify about six farmers (about 10%) from each group of 60-70 farmers to serve as his "contact farmers". Contact farmers would be drawn from all levels of village society, and would be selected in consultation with local people

taking into account their potential influence and willingness to collaborage with the FEA. Cont ct farmers could be replaced between seasons if they proved to be ineffective or ceased to cooperate. During his field visits the FEA would make special efforts to visit all contact farmers' fields and encourage them to get in touch with other farmers. Their fields would be used for carrying out demonstrations and field trials.

Given the overall technical weakness of the existing staff, all extension personnel would go through two year pre-service training at the FMETC or at an ETC. In the case of the present NES staff who will assist with the initial start up of NES prior to the establishment of FMETC, they will be recycled through an FMETC short course as new FMETC staff replace them. In addition, a program of intensive on-the-job training would be established to build up the technical competence of the staff, step by step in periodic, small, easily digestible doses of know-how directly related to the particular stage of the production process prevailing at the time. The regional senior extension staff would provide this type of training for DEOs and FEAs at regional headquarters or at ETCs, in groups of 30 to 40, on fixed days, say Wednesdays or Thursdays, once every two weeks. The regional officers would, in turn, attend training sessions at the National Extension Service headquarters in Afgoi conducted by the Headquarters Crop Production and the Plant Protection Specialists under the supervision of the Director of the NES. These sessions would be held on the first and second day of each month.

Farm Management Advisory Service (FMAS)

Over the past several years the GSDR has invested a large amount of capital in semi-industrialized state farming schemes. These farms are primarily large-scale irrigated ventures developed with the idea of "drought proofing" or assuring a reliable source of food which is not dependent upon rainfall. The farms have not lived up to expectations and the Government is hoping to put them on a sounder footing to begin recapturing some of their large capital investment.

At present, state farms are administered rather than managed because of the lack of a farm management capability in the country. The Project would partially correct this situation by providing for the establishment and operation of the FMETC, but this alone is not sufficient, since neither the FMETC nor the MOA would have the capability to provide effective field backup for newly-trained management personnel. Moreover, even with the FMETC in place, the Government would be left without formal channels for policy oriented feedback on the performance of the mostly Government-controlled large-scale farms. The Project would, therefore, provide for the establishment of a Farm Management Advisory Service (FMAS) as part of the Department of Production and Extension. It would be located at Afgoi, next to the National Extension Service headquarters. The major functions of the FMAS would be:

(a) To develop and implement a program of regular advisory visits to all Government controlled large-scale farming operations, including State Farms, Settlement Schemes, Crash Program Farms, Seed Farms, Joint Venture Farms, Cooperative Farms and Agricultural Development Programs. Initially, the advisory function would be limited to account-keeping, financial control, input procurement, marketing of crops, farm planning, the setting of management objectives, and feedback to the MOA on ways and means of improving the management and productivity of large-scale agriculture. As it develops its technical capability, the FMAS would expand its advisory function and progressively assure the flow of technological know-how to large scale farms and the exchange of information between farms, training and research institutions and policy makers at the MOA.

(b) To develop a suitable farming environment where farm management trainees would spend the field internship stage of their pre-service training. Due to the absence of reasonably well-operated state farms, there are no suitable establishments where trainees could learn the practical day-to-day aspects of farm management unless an effort is made to correct the situation. Accordingly, the Project would provide for the rehabilitation of a 400 ha State Farm at Janale, which would become the Demonstration State Farm (DSF); the Project also would provide management assistance for two other state farms nearby. The three farms would accomodate trainees during their internship period; they would be treated as regular full-time employees. Field training on these three farms would be progressively diminished as other farms are upgraded. The DSF would, in addition, provide the other large scale farms, the Government, and the training and research institutions with a sample of the benefits resulting from sound management and efficient farming practices in the Somali farming environment. It would also generate farm management data in the form usable by the training institutions and by Government. The DSF would operate on a commercial basis and would be expected to be financially independent and viable by the end of the third year of the Project period.

(c) To develop and operate a system for the gathering and processing of country-wide farm management data for use by training institutions, Government agencies, and the FMAS itself. As part of this function, the FMAS would adapt the Unified Accounting System of Somalia to meet farming requirements and introduce its use on the State farms.

Farm Management Extension Training Center (FMETC)

As discussed in the 1981 CDSS, the critical need in the Agricultural Sector, as well as most other sectors, is to develop the trained manpower base to provide services to the rural population. The NES and FMAS cannot function effectively without a supply of well trained staff at all levels.

At present the limited field extension staff is drawn directly from the Agricultural Secondary School or the Faculty of Agriculture at the University. These agents have a reasonable theoretical knowledge of Botany, Agronomy, Soil Science, etc., but lack practical hands-on experience and any training in communication methods. Before they become effective agents of change they need practical training to give them the ability to work in a demonstration based system.

The curriculum at the Farm Management Extension Training Center (FMETC) will be directed toward giving the students classroom instruction and practical experience to allow them to apply their theoretical knowledge to real field conditions utilizing the "technical package" proposed for extension as a base and a "case studies" approach to teaching.

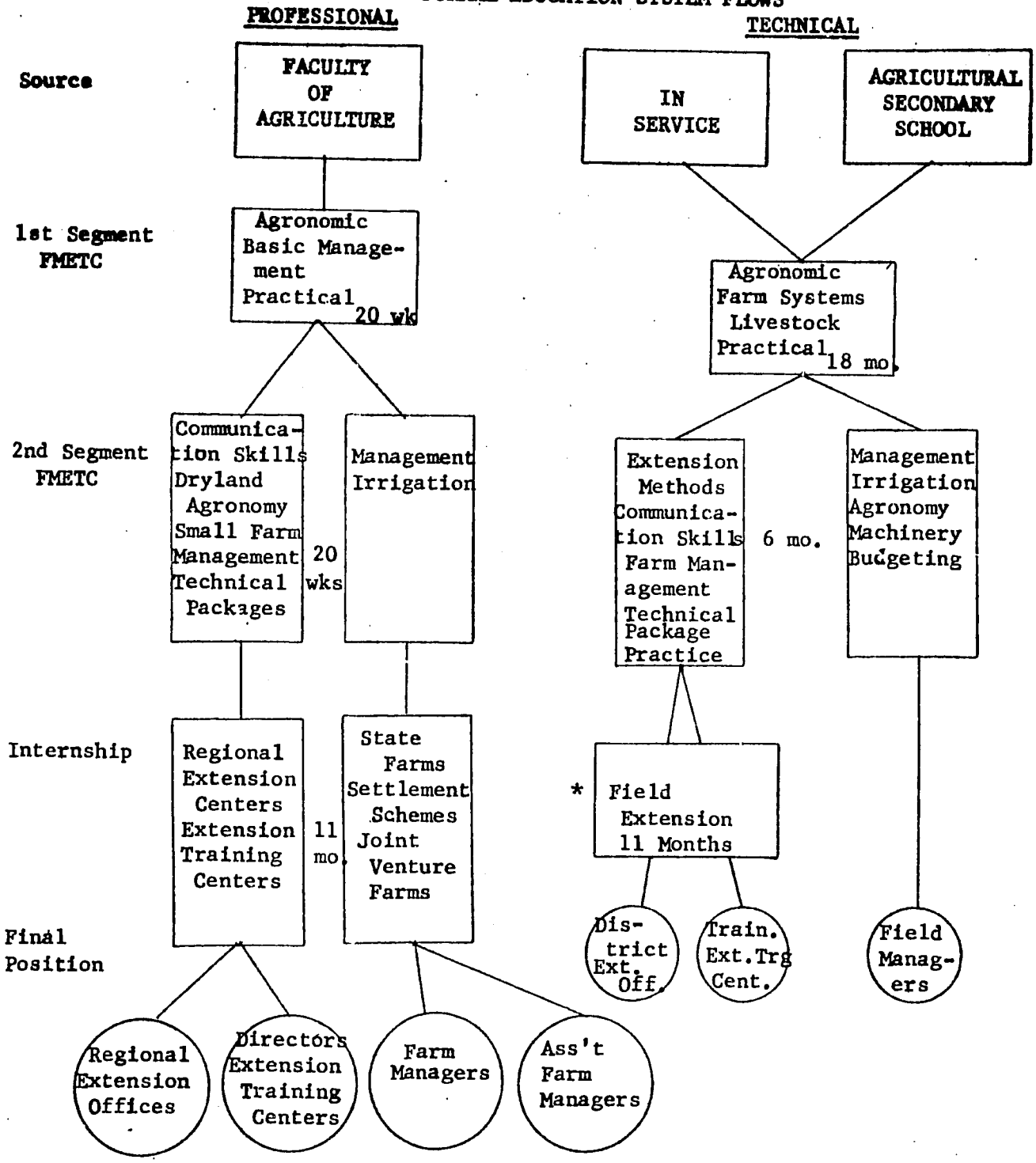
The FMETC will be responsible for providing training at two levels and in two different but overlapping streams. Table 3 presents a schematic which shows the types of training proposed.

Professional level training for senior field administrators will be a 40-week course with an 11-month practical internship. The students for this course will be drawn almost entirely from graduates from the Faculty of Agriculture at the University of Somalia. The first 20 weeks would find the entire class taking courses in Agronomy, Soil Science, Basic Farm Management, etc., with one-fourth of the time spent on practical work on the school farm, one-half spent in the classroom and the remaining one-fourth in specialized practical work. The second 20 weeks would find the class split into two with those students who are scheduled for the National Extension Service (NES) taking courses emphasizing communication skills and extension methodology, dryland crops, animal husbandry, management of farms as integrated systems, etc. The remainder of the class, which is scheduled for management positions on State Farms, will emphasize irrigated agriculture and business management. Practical experience will continue to constitute approximately half of the curriculum during the second segment of training. Following the 40 weeks of practical training, the students will go into the field as interns in Regional Extension Centers or Extension Training Centers for NES people or on State Farms for the state farm people. The internships will be supervised by the staff of the FMETC.

Technical staff will follow a similar program but with longer periods of residential training. The technical staff who will ultimately be either district extension officers or trainees at the extension training centers or field managers on state farms need a strong base of knowledge regarding the technical aspects of the production process. Thus, crop and animal production techniques will be emphasized. Further, the NES staff needs a good understanding of the basic principles governing the proper use of the means of production. Therefore, farm management principles will be emphasized in the farm management curriculum.

TABLE 3

FMETC
FORMAL EDUCATION SYSTEM FLOWS



*May not be functional in years 1 & 2 as demand for management personnel may preclude internship. Close supervision from T.A. will provide on-the-job training.

There is provision for an internship program for the technical staff of the NES to spend a year as an extension agent under the supervision of NES. This is not likely to be implemented in the first years of the project due to the projected high demand for district officers and trainers for ETCs, but will be installed as sufficient trainees become available.

The creation and development of a school farm with labor and management provided by the FMETC is viewed as critical if the curriculum is to become practically oriented. Each student will be spending a substantial proportion of his time actually working on the school farm gaining closely supervised, "hands-on" experience with the technical packages which he will be working with. The government has identified the land for the school farm and the conditions precedent call for this land to be definitively set aside for the farm prior to disbursement of the AID/IBRD or ADF funds.

Research

The last critical element of the delivery system is an ongoing research program to assure a constantly improving technology for dissemination. In view of the facts, first, that agronomic analysis indicates an abundance of existing technology, tested and proven in Somalia, which has never been extended to farmers; and secondly, that the research program must be well planned and targeted to maximize its utility; the approach taken in the project is to undertake a complete review of the research needs and capability, devise a research strategy and plan and prepare a proposal for financing under a follow-on program.

Adaptive research, field testing, etc., will continue prior to the financing of a complete research program under funds provided under Project 0101 and the Bay Region (0113) but a full-scale research program incorporating basic and applied research will await completion of the strategy.

Project Inputs

NES. In order to accomplish what is planned above for the National Extension Service, it is necessary to construct numerous staff houses and offices and audio-visual facilities at the Afgoi center; houses and offices at regional centers and to renovate the Bonka and Jannale Extension Training Centers. The civil works will provide the facilities for the NES and will be financed by the African Development Fund.

The NES also requires technical assistance (19 person years) to serve as the technical expertise and management assistance for the newly expanded organization. It is anticipated that an agricultural extension specialist, a plant protection specialist, a farm systems/farm management specialist and a communication specialist will be required for 4-5 years each. The technical assistance is being financed by AID.

To complement the technical assistance, 16 persons years of participant training are foreseen to prepare Somalis to fill the technical positions. The training for NES will be financed by AID.

Miscellaneous commodities including vehicle support, office and household furnishings, etc., are required and will be financed by AID.

Local salaries and assorted local costs will be partially financed by the World Bank and partly by the GSDR.

FMAS. The FMAS requires considerable civil works to develop the Demonstration State Farm and housing and offices and equipping of these units. All the costs are borne by the African Development Fund (ADF).

The IBRD is financing 14 person years of technical assistance and 12 years of training for this component.

Local salaries and operating costs for the Demonstration State Farm are partially financed by the African Development Fund and those costs for the FMAS are shared by the IBRD and the GSDR.

FMETC. The major construction activities for the FMETC including classrooms, dormitories, housing and the school farm are financed by the ADF.

AID will finance the 22.5 person years of technical assistance for the FMETC. This includes an agricultural training specialist/assistant principal, two agronomists, an agricultural engineer, a master mechanic, and a farm management specialist.

Participant training is planned for 24 person years to provide replacements for the technical assistants. This will be financed by AID.

Commodities, including vehicles, library, classroom, dormitory, housing and workshop furnishings and equipment for the school farm are included under AID financing.

Agricultural Secondary School

Since it is critical to upgrade the curriculum at the Agricultural Secondary School to provide suitable trainees for the FMETC, additional staffing for the school will be provided under funding from the European Economic Commission (EEC) through a grant administered by the IBRD.

Evaluation

Due to the need to measure impacts of an institutional project such as this on a national or at least regional basis, the IBRD is financing a Central Statistics Division in the State Planning Commission to collect and analyse basic data. This component includes seven person years of technical assistance, 14 person years of participant training and miscellaneous commodities and local costs.

Project Management Unit (PMU)

As will be discussed later in the implementation section of this paper, the PMU is the management unit to handle implementation of the project.

The civil works consisting of houses and offices are financed by the ADF and the ten person years of technical assistance, eight person years of training and a portion of the local costs are funded by the IBRD.

Table 4 summarizes the contribution of each donor to various components. Detailed input lists for each component and each donor can be seen in Annex 12.

TABLE 4

DONOR ASSISTANCE TO VARIOUS COMPONENTS

	COMPONENT					
				AGRICULTURE		
ITEM	NES	FMAS	FMETC	SECONDARY	CSD	PMU
Civil Works	ADF	ADF	ADF	-	-	ADF
Technical Assistance	AID	IDA	AID	EEC	IDA	IDA
Training	AID	IDA	AID	EEC	IDA	IDA
Commodities	AID	ADF	AID	EEC	IDA	IDA
Local Costs	GSDR/ IDA	GSDR/ IDA	GSDR/ IDA	GSDR	GSDR/ IDA	GSDR/ IDA
Land	GSDR	GSDR	GSDR			GSDR

ADF - African Development Fund

IDA - Low interest window of World Bank

GSDR - Government of Somali Democratic Republic

EEC - European Economic Commission

AID Contributions to the Project

AID's contributions to the project were determined after a careful review of the components to define which ones were most applicable to our Congressional Mandate and which ones were areas in which the United States has acknowledged expertise. In general, the AID contributions are directed toward the delivery of extension services to small farmers. The NES is the basic institution for this service and aside from civil construction and local salaries, is funded almost entirely by AID. We view this institution as critical in developing and implementing the new small farmer-oriented policy. The small core staff of technical assistants will provide technical and management expertise to guide and supervise the system during its formative years. Additional technical expertise will be drawn from technical specialists at FMETC who will serve as extension specialists as well as teachers.

One of the greatest needs for the NES to be effective is a supply of well-trained staff. Participant training is provided for Somalis to permit them to replace the technical assistants at the central level by the end of the project. In addition to this high level overseas training, a large cadre of trained extension specialists is needed. As discussed earlier in this section, the pyramidal extension structure requires varying levels of training at the various levels in the institution. The U.S.-trained staff will function primarily at the central level. The remaining levels of the system will be staffed with locally-trained persons. In order to effectively train the several hundred persons required, the project will create a practical oriented training center, the FMETC. AID will provide the technical assistance, training and commodity support for the FMETC. By unifying all the extension training under the U.S. umbrella, we assure consistency of extension methodologies and enhance coordination between training and field work to facilitate good information flows both up and down the system to keep the training relevant. As discussed in the organizational analysis section of this PP, this coordination is considered critical to success.

The FMETC will train regional and district extension agents and directors and trainers for the Extension Training Center (ETC). It will assist in developing curricula and supervise the inception of the training programs at the ETCs. The training programs at the ETCs will train the Field Extension Agents (FEAs) utilizing an initial intensive short course with regularized follow-up training to keep the FEAs current on the most timely actions.

The FMETC will also be training a small number of farm managers and field managers for the FMAS. Although AID is not supporting the FMAS, it was deemed prudent management to have a unified team under one financing source providing support to the FMETC. As discussed earlier, the first half of the curriculum for both farm managers and extension personnel is identical and it is only in the second half that specialization occurs;

and in the second half, the same teachers, with the exception of the master mechanic, are required. Therefore, in the interests of avoiding duplication of skills and to assure a more tightly knit faculty, AID will finance all of the staff for the FMETC.

AID will also undertake the survey of research needs and capabilities in order to devise a research strategy and plan. Once a firm strategy and proposal have been developed, the Ministry of Agriculture will seek financing from the donor community.

Analysis

General

The analysis for this project was undertaken in several steps. Initially an IBRD identification mission reviewed the sector and detemined that the requirement for institutional support for the delivery of improved technology to the small farmer segment of the sector was critical and that there was a need for strengthening management on the public sector farms. A UNDP/FAO-IBRD team under their joint coordination program was then fielded and defined the "minimum package" approach and likely interventions into the institutions. It was at this point that the initial AID project identification team reviewed the Agricultural Sector. They concurred in the IBRD analysis of the Sector and the IBRD invited AID to participate in the program as a co-financer.

In early 1978 the IBRD appraisal team went to the field to develop the basic documents on the project. AID contributed an Agricultural Extension Specialist from REDSO/EA who assisted in defining the approach to extension and training. IBRD analysts undertook agronomic, economic and institutional analyses at this point and prepared their appraisal documents.

Upon establishment and staffing of the USAID Mission in late 1978, the IBRD appraisal was carefully reviewed and components attractive to AID were identified and programmed for AID funding. In early 1979 a PID was prepared based on the IBRD draft appraisal report. In March, 1979, a team of four specialists from Utah State was fielded to assist the Mission in completing the analysis of the project with special emphasis on the portions funded by AID. The results of this final analysis are summarized below and may be reviewed in Annexes 7 to 11 of this paper.

Extension Methodology

1. Strengthening of the delivery system is critical to the revitalization of the small farmer segment of the Agricultural Sector. A means must be developed to take presently known, proven technologies and improved technologies developed and tested to the farmers for application. In an area with a strong oral tradition and only a newly developed written language, the only possible means is via an intensive person-to-person approach.

2. The requirement for properly trained extensionists at all levels is central and critical to the extension approach. The utilization of the agricultural faculty of the University and/or the Agriculture Secondary School as the mechanism for this training is not feasible due to the present overburdening of these institutions. Therefore, utilizing those institutions, particularly with the strengthening of the Agricultural Secondary School under EEC financing in the Project, as institutions to provide the theoretical base in agricultural principles and developing a very practical oriented FMETC to provide "hands-on" training is a very rational approach.

3. The pyramidal model for the extension system is the most appropriate given the serious manpower constraints. Utilization of FMETC-trained personnel as supervisors and trainers of Farm Extension Agents gives a great multiplier effect to the training program.

4. The pyramidal model is functional only if continual retraining and supervision are built in at all levels. The system as designed does provide for constant training, supervision and referral.

5. Ultimately the system is only as good as the feedback mechanisms developed within it. The system has allowed for these mechanisms but it is not possible at present to predict whether the mechanisms will function as planned or not. Evaluation will look closely at this and redesign if necessary to insure a working system.

Agronomic

1. Substantial increases in crop yields and production can be realized by introducing appropriate technology requiring little capital investment. There is great potential for both intensifying production on presently cultivated land and for expanding production on presently unutilized lands. Technology levels on most farms are presently so low that the introduction of very inexpensive "minimum package" technologies would have large impacts on overall production.

2. Minor changes in cultural practices, already proven by use by a limited number of farmers, would raise yields substantially. Further extension of packages developed under the early Wyoming State effort would have dramatic effects.

3. The shifting of emphasis to consideration of a mixed farming system rather than crops as one enterprise and livestock as a separate enterprise is critical to long-term success. Structures exist in this' project to begin this shift. The livestock training to be added to the Agricultural Secondary School and the livestock and farm management training to be conducted at FMETC begin to form a nucleus of staff trained in both disciplines and their interaction. The NES, through its

Technical Coordination Committee, will begin focussing attention on an integrated system. Projects such as the proposed Bay Region Development Project which takes an integrated approach to livestock and agriculture in areas of high farming potential will begin putting the theory of an integrated farming system to work.

4. There is great interest and a correspondingly high potential for the use of animal traction both to expand cultivated areas by reducing the labor constraint and to increase yields on existing lands by improving the timeliness of operations by reducing peak labor demands. This is an area in which the residual effects of the Wyoming team's project is most evident in their pilot villages. The fact that the use of animal traction has persevered for 10 years without any pressures from outside the village proves its perceived value to the farmers.

5. There is substantial potential for increasing crop diversification to include pulses, sesame, groundnuts and other crops. These have all been introduced and tried on a small scale for many years.

6. Rainfall of 400-500 mm, spread over 2 seasons per year in heavy water-retaining soils such as are found in the majority of the primary agricultural areas, is sufficient to grow high yields of many crops including cereals, oil crops and fiber crops. Droughts in these areas are neither as frequent nor severe as much of the literature suggests. A review of the rainfall records for the years 1922 to 1940 and 1951 to 1971 for the Bay Region indicates 7 years where the rainfall fell below 450 mm and only one time where it was below 450 mm for more than one year in a row.

7. It appears that the reason technologies, identified and introduced into pilot villages by Wyoming in the 1960s, were not spread more widely was a lack of follow-up in a well-structured extension service. Given the shift of government policy back to a small farmer program, the present project should be able to pick up where Wyoming left off and develop the delivery system to take the technology to a majority of the farmers.

Livestock

1. As discussed in the Agronomic section, Livestock can make a definite contribution to productivity in the farming system. There is also significant potential for increasing the productivity of the herds themselves given proper integration.

2. Utilization of crop residues on a more systematic basis and more closely linking livestock to crops will improve productivity of the livestock through improved nutrition.

3. In socio-economic groups, such as those found in Somalia, where the farmers are also herders with herds and flocks as well as cultivated land the only reasonable approach is an integrated approach.

4. Changes in herd management practices, including shifts in herd composition, could increase productivity per animal unit four to five times while requiring very little capital investment.

5. There is great potential for increasing yields through more selective breeding and better breeding management. The Somalis have an excellent reputation as good animal husbandrymen, and further encouragement of outcrossing among local breeds, to say nothing of exotics, would have positive effects.

6. Animal health programs must be coupled with the nutritional and breeding programs if the potential increases are to be realized. Mortality rates would decrease and reproduction rates would increase resulting in more efficient utilization of vegetative inputs and allowing an increased offtake.

Economic

1. Given Somalia's balance of trade problems, the need to decrease imports and increase exports is undeniable. Since at present approximately 20% of their imports are in the form of food (primarily cereals), a project to lay the base for increasing food production is critical to their development. Since livestock constitutes their primary export commodity, the expansion of production in this sector will increase their limited foreign exchange earnings. In terms of overall government priorities, increasing staple food production ranks first and increasing exports ranks second.

2. The government price policy is favorable to farmers. The urban subsidy policies, common in many developing countries, are not found in Somalia. Price adjustments have tended to lag somewhat behind market trends due to a lack of market information, but as they catch up are favorable. The Agricultural Development Corporation (ADC) was established in 1971 to purchase marketed surpluses of sorghum, maize, oilseeds and cotton from farmers. The ADC has numerous local representatives who man buying stations in their villages but does not have universal coverage. The spread between farmer price and wholesale is enough to allow ADC to pay reasonable stipends to buyers and there are plans to recruit buyers in all villages in agricultural areas.

3. Imported agricultural inputs are not utilized extensively in the country. Past experience has been to exempt them from duties and taxes and often subsidize their cost to farmers. Because quantities involved are limited, at this stage of development the use of subsidies

may be defendable as a means of familiarizing farmers with new techniques. However, at a later stage, they become difficult to remove and could put an excessive burden on the Government budget and cause price distortions leading to an inefficient allocation of the Government's resources. The project is designed to minimize the reliance on imported inputs in its early years (up to a generation), until the factors of production clearly indicate an efficiency to be gained from their use. It is felt that placing reliance on inputs which can be made attractive financially to farmers through subsidies, while not giving true economic benefit, is not a prudent course for the donors to encourage.

4. On a micro basis, the agronomic and livestock interventions that have been proposed can significantly increase the financial returns to farmers. Net returns per cultivated hectare are projected to increase some 300-400% and net returns to labor over 800% over the 20-year period of impacts. In livestock, the potential increase in net returns is over 1000% per animal unit.

5. The internal rate of return of 27% for the NES, as calculated by the IBRD, was considered conservative by the AID team and left to stand as it was.

Social Soundness

The first of the three main questions to be covered under this section relates to the compatibility of the project with the sociocultural environment in which project activities will take place. Since the extension service will concern itself only with agriculture and farm animals as distinct from range pursuits that involve only animals, the impact of the project will primarily be concentrated in the dryland farming areas of the country. This is also the area where AID conducted a research/extension program in the 1960's that was relatively successful. Some of the practices that were then introduced have remained part of the farmers' routine. This project will reintroduce these and other practices in an expanded area and will conduct regular follow-up visits by extension personnel. Since new ideas were accepted by these farmers in the 1960's and this project will build on that base introducing new concepts along with frequent visits by trained personnel, indications are positive that the project will be compatible with the socioculture of the area. In addition, an on-going related program will have gained added information on sociocultural effects of increased production and income, and these factors will be considered during project start-up and implementation.

The second area under this section relates to the spread effect of project activities, i.e., that key "contact farmers" will effectively diffuse knowledge of improved cultural practices necessary for increases in production. About 10% of the farmers in each Field Extension Agent's

territory (6 or 7 persons) will receive special attention as "contact farmers". Potential influence, willingness to cooperate and geographic distribution will be the main criteria in selecting these individuals, and their land will be used for carrying out demonstrations and field trials. It is then assumed because of leadership qualities, they will actively spread information about methods that increase production. This might be done formally through meetings of area farmers as well as informally in village market places. An added factor that will contribute toward diffusion of modern techniques is the homogenity of the inhabitants, and, unlike many other LDC's, they have a common language. Although there are tribal groupings, there are also close ethnic affinities and common interests. Further, the contact farmers are likely to be the most successful individuals in their communities and thus should be effective agents of change. The use of peer groups or elders to provide counsel and advice is an accepted practice.

The third factor is the social impact of increased income. It is expected that, initially, farmers will buy more cattle and other animals to provide a buffer or insurance policy against unfavorable climatic conditions. Clearly, higher incomes will result in an improvement of the standard of l[illegible] of the target groups, i.e., improved nutrition, shelter and satisfaction of basic human needs. The principal beneficiaries will be the women and children in the communities served by the program. These considerations would suggest that the program will have a positive social influence.

It is apparent that women in Somalia, as in much of Africa, are vital to rural development. They make most of the household's sanitation and nutrition decisions, and in agriculture at least, implement if not make many of the basic decisions related to crop and livestock production. They customarily perform the lighter cultivation tasks, such as weeding and helping in harvesting. They also look after the sheep and goats and fowl.

The project will encourage integration of women at all levels of the extension service. Some socio-cultural resistance to accepting women as agents of change is evident among the farming community so their effectiveness will be carefully monitored. There are no restrictions against men intermingling with and working with the women of the farming families. Thus women are more likely to be involved as receptors of the message rather than as agents of change.

Women exercise much more influence than is superficially apparent. They customarily play an important informal role in decision-making and they exercise considerable influence over their children. Equally important, the Somali Government is firmly committed to a policy of female emancipation and women have shown that they are ready to participate. Those

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in the farming areas are already involved at the local level and can play an important positive role in the implementation of the program. This will be in full accord with their involvement at the local level in the People's Vigilante Corps (The Guulwaadayaal) which coordinates hygiene and welfare inputs at the district and subdistrict level.

Environmental

The IEE for this project was submitted, reviewed and accepted along with the PID. It recommended a negative determination be made.

Financial Plan

Table 5 presents a project cost summary by major component and by type of expenditure for the entire project.

Costs are estimated on the basis of prices expected to prevail in March 1979. Physical contingencies are allowed at the rate of 10% of capital and operating costs items, except salaries. Price contingencies have been calculated at the following rates: vehicles, equipment and all other operating costs 6.5% for 1979 and 6.0% per year thereafter, and civil works and salaries and wages 10% for 1979 and 8% per year thereafter. Physical and price contingencies combined represent 30% of base costs. Price contingencies alone represent 25.7% of base costs over the Project period. The Government of Somalia does not levy import duties on goods for the agricultural sector. Consequently all capital items and some of the major operating costs, such as fuel, are included without such duties. The estimated Project costs, however, include income taxes on salaries and wages of local personnel aggregating to about So. Sh. 4.4 million (US$0.7 million). Costs of internationally-recruited staff are estimated at US$80,000 per man year, except for those employed by the Agricultural Secondary School who were costed at US$50,000 per man year because the positions are junior ones. Local salaries are those suggested by MOA and include field allowances and per diem for all Project staff. A total of US$0.5 million is included in Project costs to pay for consultancy services to help PMU with procurement-related matters and for follow-up studies needed for preparation of a second phase Project, if needed.

The Project financing is provided by four donor agencies and the GSDR. It is shared in the following proportions and amounts:

	Amount US$ million	Percentage of Total Project Costs	Percentage of Net Project Costs
IBRD	10.50	32.3	33.1
ADF	8.88	27.4	28.0
USAID	7.76	23.9	24.4
EEC	1.50	4.6	4.7
GSDR	3.10	9.6	9.8
Net Costs	31.74	97.8	100.0
Taxes	0.70	2.2	-
TOTAL COSTS	32.44	100.0	

TABLE 5

Project Cost Summary

Project Component	So. Sh. Million Local Currency	So. Sh. Million Foreign Exchange	So. Sh. Million Total	US$ Million Local Currency	US$ Million Foreign Exchange	US$ Million Total	Foreign Exchange
Project Management	7.1	11.1	18.2	1.1	1.8	2.9	68
Consultancy Services: Procurement and Preparation Phase II	-	3.2	3.2	-	0.5	0.5	100
Farm Management and Extension Training Center	11.4	23.9	35.3	1.8	3.8	5.6	66
National Extension Service	27.5	27.5	55.0	4.3	4.4	8.7	50
Farm Management Advisory Service (excluding DSF)	1.7	6.9	8.6	0.3	1.1	1.4	79
Demonstration State Farm	7.2	12.8	20.0	1.1	2.0	3.1	65
Research	-	0.7	0.7	-	0.1	0.1	100
Central Statistical Department	1.3	5.4	6.7	0.2	0.9	1.1	82
Consultancy Services for Civil Works	-	1.2	1.2	-	0.2	0.2	100
Agricultural Secondary School	0.3	7.8	8.1	0.1	1.2	1.3	92
Total Base Costs	56.5	100.5	157.0	8.9	16.0	24.9	64
Physical Contingencies	2.4	4.4	6.8	0.4	0.7	1.1	64
Price Contingencies	15.2	25.0	40.2	2.4	4.0	6.4	64
TOTAL COST	74.1	129.9	204.0	11.7	20.7	32.4	64
Type of Expenditure							
Vehicles and Equipment	1.9	15.4	17.3	0.3	2.5	2.8	89
Civil Works	17.7	16.8	34.5	2.8	2.7	5.5	49
Technical Assistance	-	47.4	47.4	-	7.5	7.5	100
Training Abroad	-	8.8	8.8	-	1.4	1.4	100
Local Salaries and Wages	32.0	-	32.0	5.0	-	5.0	-
Operating and Maintenance Costs	4.9	12.1	17.0	0.8	1.9	2.7	70
Total Base Cost	56.5	100.5	157.0	8.9	16.0	24.9	64
Physical Contingencies	2.4	4.4	6.8	0.4	0.7	1.1	64
Price Contingencies	15.2	25.0	40.2	2.4	4.0	6.4	64
TOTAL COST	74.1	129.9	204.0	11.7	20.7	32.4	64

The proposed IDA Credit of US$10.5 million would be to the Government of Somalia on standard IDA terms. IDA would co-finance the Project with ADF, USAID, EEC Action Fund and Government along the lines described in Table 4. IDA would provide funds for establishment and operation of Project Management Unit, for operation of the Farm Management and Extension Training Center and the National Extension Service and for assistance to the Central Statistical Department in the Planning Commission. ADF would finance civil works and the Demonstration State Farm except technical assistance.

The AID contribution to the Project is the financing of the noncivil works portions of the NES and the FMETC. A summary of the AID contribution is shown in Table 6 and details may be found in Annex 12.

TABLE 6

USAID Contribution Summary
($000)

ITEM	Year 1	Year 2	Year 3	Year 4	Year 5	TOTAL
Technical Assistance	240	600	800	800	800	3,240
Training	4	149	214	289	210	866
Commodities	230.9	783.9	92.9	92.3	170.8	1,370.8
Research Study	111	0	0	0	0	111
Contingencies	13	78	154	100.8	108.4	455.2
Inflation	47	251	347	458	606	1,709
TOTAL	645.9	1,861.9	1,613.9	1,735.1	1,895.2	7,752

The AID contribution is utilized 43% for technical assistance, 11% for training, 18% for commodities, 6% for contingencies and 22% for inflation. It is estimated that 97% of the AID contribution will go for foreign exchange costs.

Among the other donors the IBRD is giving an IDA credit of $10.5 million, 33% of the Project cost, on standard IDA terms. These funds are for establishment and operation of the Project Management Unit, for operation of the FMETC and NES for staff and operation of the FMAS and for assistance to the statistical department in the Central Planning Commission. The

ADF loan of $8.88 million will finance civil works and the demonstration state farm. The EEC grant of $1.5 million will finance assistance to the Agricultural Secondary School.

The GSDR is contributing $3.8 million in salaries, taxes, etc., in addition to nearly 1,000 hectares of land and buildings in kind. This $3.8 million amounts to 11.7% of the total project cost and equals 32.8% of the AID plus GSDR contribution. As a multi-lateral Project, the project is not restricted by Section 110(a) of the Foreign Assistance Act relating to the 25% contribution.

Financial Analysis

The Project would provide the basis for building efficient extension and farm management services necessary to increase the productivity and income of farmers in Somalia. The estimated 180,000 farm families, who would progressively be served by the NES, are all subsistence farmers. The cost of the extension component would amount to US $60 per farm family, or on the basis of the area presently cultivated by small farmers, to about US $18 per ha for the investment period. A high proportion of these costs is intended to pay for technical assistance and staff housing. Without these two items extension costs would be US $32 per farm family or US $10 per ha.

Based on an estimated area of about 240,000 ha planned for large scale production units to be progressively covered by the Project, the cost of the Farm Management Advisory service including the DSF would amount to US $24 per ha for the investment period. Without the technical assistance, the cost would be US $16 per ha.

After the implementation period, Government would have to meet recurring operating costs of about So.Sh. 29 million (US $4.6 million) per annum (in 1984 prices) as well as meet debt service payments to IDA and the other financiers. The Project would earn direct income through the sale proceeds of production at the Demonstration State Farm and would save on subsidy paid for grain that would have been additionally imported in the absence of the incremental production ascribable to the Project. In addition, Government would also recoup part of its expenditures, through income tax levied on salaries paid under the Project.

Over the estimated life of the Project (15 years), the incremental revenues and expenditures ascribable to the Project would be as shown below:

	Million So.Sh.	Million US$
Credit	(+) 182	(+) 28.9
Tax revenue	(+) 19	(+) 3.0
DSF sales	(+) 52	(+) 8.3
Savings on import subsidy	(+) 241	(+) 38.3
Project costs and maintenance	(-) 490	(-) 77.9
Debt services	(-) 26	(-) 4.1
	(-) 23	(-) 3.5

Within the projected 15 years, Government's net cash flow would be negative until year 11 (except for years 3 and 4) and positive thereafter. In year 15, the cumulative cash flow would still be negative at So.Sh. 23 million (US $3.5 million). It would, however, turn positive in year 16 and remain so thereafter. Possible farmers' contribution to Government revenues through incremental indirect taxation resulting from increased income are expected to be significant but have not been taken into account.

The recurrent cost analysis for the project indicates that the recurrent costs of the NES amount to some 9.3 million Somali shillings in the years after year 5. Of this amount only about 6.5 million is additional to present recurrent costs. The majority of the additional recurrent costs are the nearly 5.0 million for the Farm Extension Agents who are the critical final step in the extension structure.

The recurrent costs for FMETC amount to about 3.0 million Somali shillings all additional to current expenditures. Approximately 800,000 of this is for operations and the remainder for salaries including 1.3 million for subsistance and allowances for trainees.

The current GSDR budgets allocate some 28 million Somali shillings to the Ministry of Agriculture for ordinary expenses. The Ministry will be required to pick up an increasing share of the recurrent costs of the project beginning at the end of year 2. The Ministry of Finance has been involved in all discussions of the project and is aware of the need for an increased budget for the Ministry of Agriculture to support this project.

Agronomic and Economic analysis indicates that over 60,000 additional tons of cereals will be produced in year 15 due to the NES. This has a total value of over 120,000,000 Somali shillings and represents a foreign exchange savings of 20,000,000 dollars as import substitution. A 10% taxation of this incremental production would permit recovery of recurrent costs. As early as year 5 of the project the value of incremental production exceeds the recurrent costs of the project. See Annex 11 for details.

IMPLEMENTATION

Organization

The project will be implemented by the Ministry of Agriculture. A Project Management Unit established and funded under the project will have administrative responsibility for implementation. The PMU will be staffed by a Somali Project Manager, an expatriate technical advisor to the Manager and an expatriate controller. Local accounting and administrative personnel will be drawn from the GSDR.

The PMU will rest directly under the Director General of the Ministry of Agriculture and will function as an independent unit. Initially, at least, the Project Manager will concurrently hold the Office of Director of Extension in the Ministry. Since the project and the Extension Service are so closely linked, this is a very desirable sharing of functions.

The PMU will be responsible for operational implementation of the project. It will be responsible for contracting, procurement and finances for the project. It will perform a planning and coordinative function insuring that all pieces are moving forward in lock step. It will handle the day-to-day implementation requirements for the project.

On a policy level, the primary direction comes from the Ministry of Agriculture itself. The PMU, other units strengthened under the project, and other divisions of the Ministry, including the Technical Coordination Committee, advise the Minister on policy matters. Decisions by the Minister are then passed back through the Director General for implementation by the various departments.

In terms of the AID team for the NES and FMETC in this project, they will be responsible to the Project Manager in the PMU. They will function independently in terms of their components within the overall policy guidance of the Ministry. The PMU will perform the contracting, procurement and financial management functions for the team thus freeing the team to concentrate on their technical functions. Charts 1 and 2 present organizational diagrams for the Ministry and the project staff.

Administrative Arrangements

1. Technical Services - The Mission and the Government feel that a sole university contract is the preferred mechanism for contracting for technical assistance. The services to be provided are the type for which Land Grant Universities are considered to be the best source. A strong linkage between a U.S. institution and the Somali institutions involved will have positive long-term benefits. The university to be utilized will be competitively selected with special emphasis on arid lands capability and prior experience in institutional development in developing countries.

It is planned to execute a host country contract for these services with the PMU serving as the contracting agency for the Ministry of Agriculture. If utilizing the host country contracting mode unduly restricts competition due to specific statutory restrictions regarding foreign contracts on too many universities, the Mission is willing to consider direct AID contracting with the stipulation that selection be done with the direct participation of the host country and that the contract specifically indicates that the contractor is responsible to the PMU and Ministry of Agriculture.

Chart 1

SOMALIA
AGRICULTURAL EXTENSIONAND FARM MANAGEMENT TRAINING PROJECT
ORGANIZATION OF THE MINISTRY OF AGRICULTURE

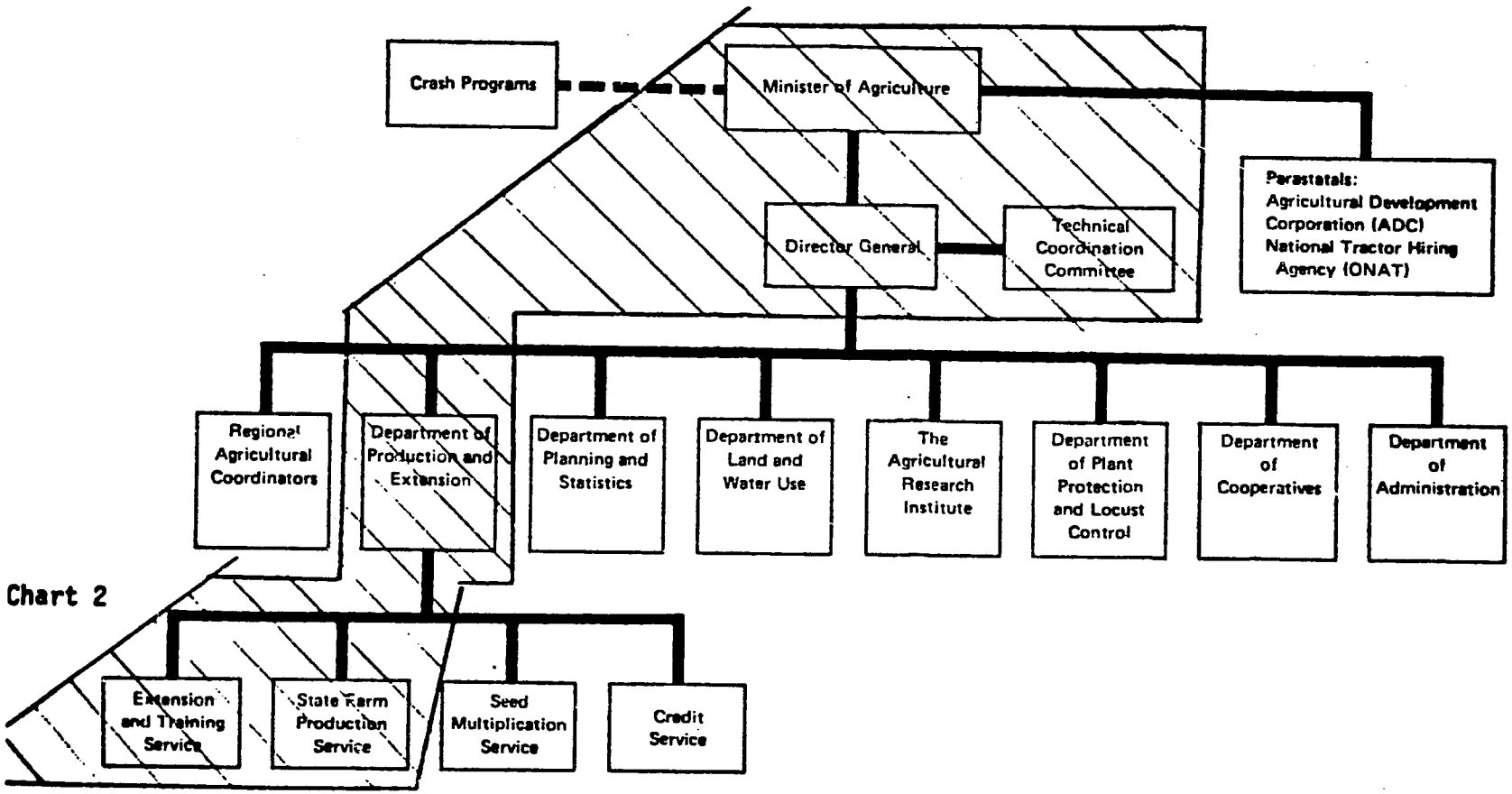

Chart 2

April 4, 1978

World Bank – 19978

Chart 2

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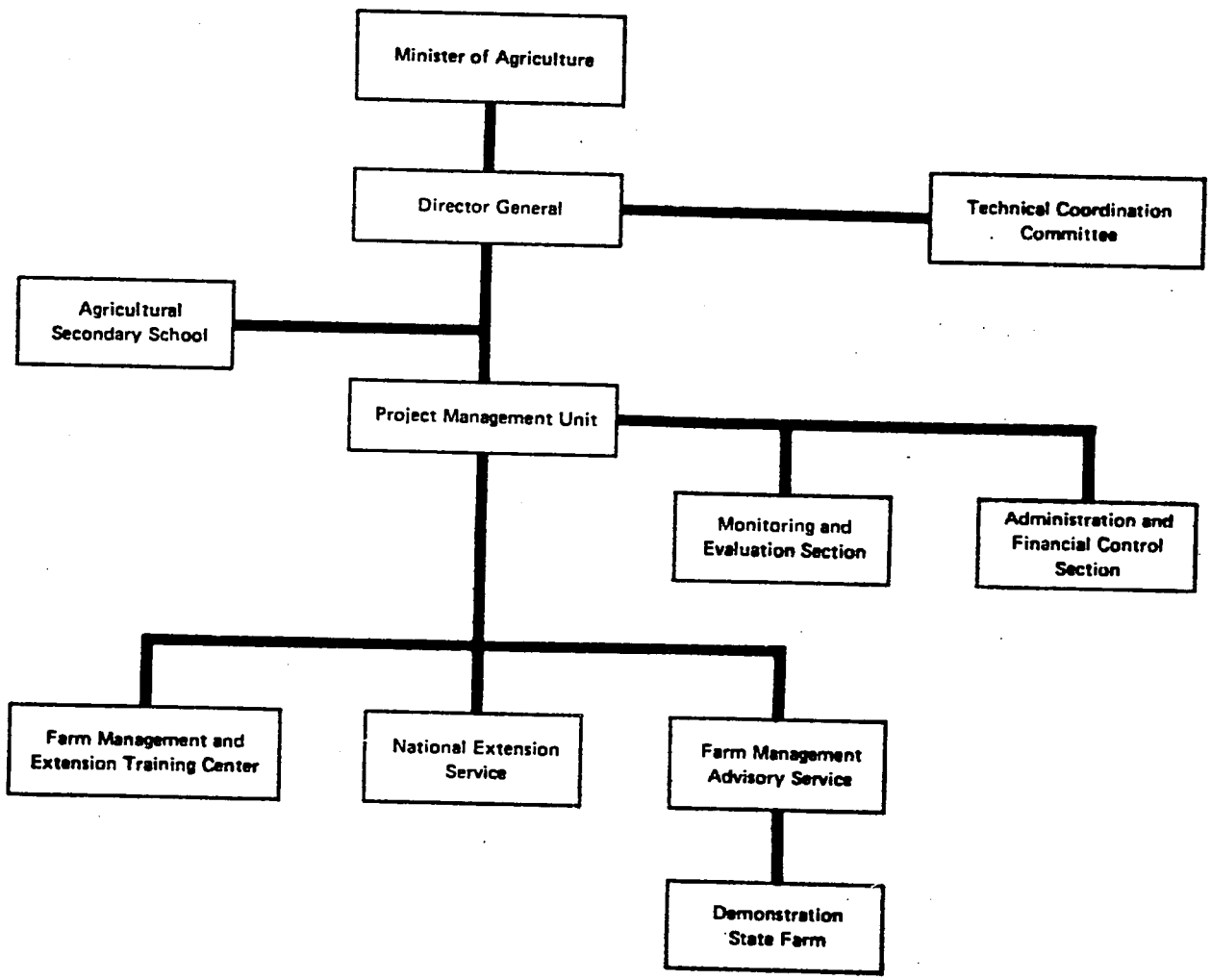
SOMALIA
AGRICULTURAL EXTENSION AND FARM MANAGEMENT TRAINING PROJECT
PROJECT ORGANIZATION



World Bank – 19879

2. Training - Training needs will be identified by the FMETC and NES for incorporation into the PMU's training plan. Trainees proposed by the NES and FMETC will be screened by the PMU who will make the final selection. Upon receipt of the training plan and nominations USAID/Somalia will submit PIO/Ps and process the participants.

3. Commodities - The PMU will hold primary responsibility for the procurement of commodities based on the guidance contained in Chapter 3 of Handbook 11. All commodities will be procured from Geographic Code 000 and 941 countries according to competitive procurement procedures. Consolidation of procurement actions and standardization, to the extent possible, among various donors will be accomplished by the PMU.

A proprietary procurement waiver will be sought for the 16 light vehicles to be procured under AID financing. In undertaking the procurement under our Project 0101, the tender specifically called for the supplier to provide a local representative for warranty and spare parts services. Reference was made in the tender to future projects to be funded by AID which would require similar vehicles. In the interest of standardizing on one manufacturer to permit a large enough operation to encourage proper supplier backstopping in the country, this project will utilize the same vehicle supplier as Project 0101. Other donors also supplying vehicles in this project have agreed to consider a similar sole source procurement of light vehicles.

Implementation Plan

Implementation planning for this project requires consideration of several critical constraints:

1. The time period (2½ years) to accomplish the civil works on facilities.

2. The time period required (11 months) to get delivery of equipment which is essential to proper functioning of the TA team.

3. The need for activities to start in advance of getting FMETC trainees in the field.

Several steps have been taken to work around these constraints. The IBRD, using non-project funding, has agreed to get the staff for the PMU on board prior to project effectiveness. This will permit them to begin preparing annual plans, procurement documents, etc., as well as set up management systems in advance thus cutting down on the lead times involved. The ADF will move forward on selection of the contractor for the architect and engineer prior to effectiveness for final tender documents can begin as soon as the project becomes effective.

Funds are provided in the IDA contribution for rental of housing, etc., for the early period of the project. USAID/Somalia is prepared to approve Title I local currency requests for additional rental needs if required.

Proprietary procurement of vehicles, as discussed above, will provide a significant savings in lead time for getting the vehicles on the ground and operational.

The extension program must get under way without waiting for trainees from the FMETC. The efforts of the USDA team in the pilot outreach program in the interriverine area will lay the foundation for the early extension program. NES in its early years will select promising in-service staff supplemented by a few new graduates and conduct intensive on-the-job training and supervision in lieu of formal training. As FMETC trainees become available to pick up field responsibilities, these early NES staff will be recycled through intensive FMETC formal training courses.

Given the amount of existing technology which has not yet been extended to farmers, the delivery program can begin without awaiting further research results. However, it is critical that an on-going research program be begun to provide a continuous flow of relevant technological advances for extension to farmers in the future. The first step in strengthening the research capacity, the development of a solid research strategy and proposal, is financed by AID in this project. Financing for implementing the proposal must be arranged and centralized research begun during the life of the project. Since research by nature is of a long-term benefit with minimal short-term impacts we plan minimal reliance on new research results.

Table 7 provides a simplified schematic of the implementation of the project. Additional details may be found in Annex 13.

EVALUATION

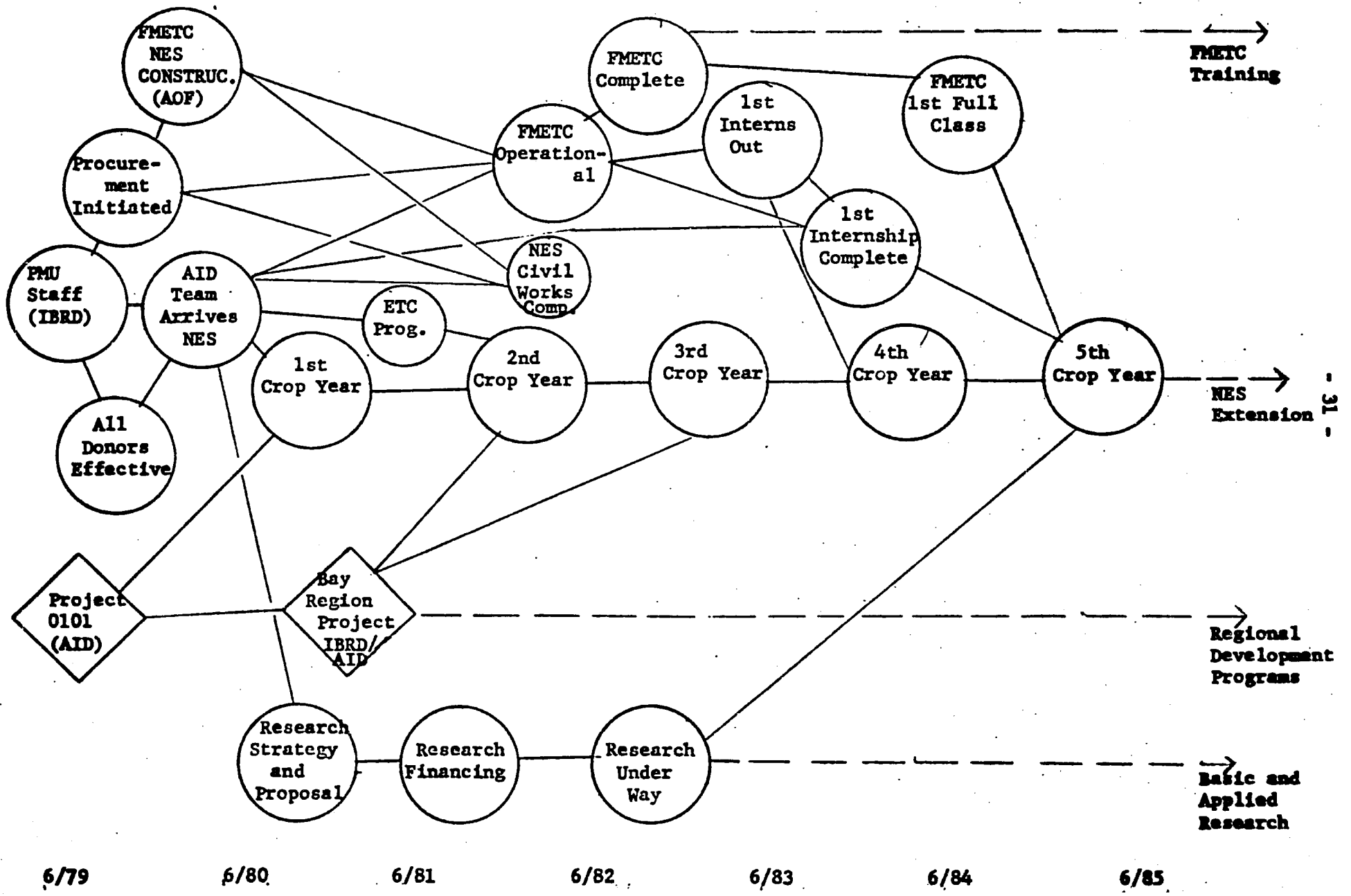
The IBRD is financing two distinct components which have evaluation functions. At the project level an evaluation unit will be installed as part of the PMU to collect and evaluate data. At a higher level the Central Statistics Division of the State Planning Commission will be supported to begin forming the base for long-term evaluation on a national basis of the impacts of this and other institutional projects.

Monitoring and Evaluation

The Extension and Farm Management Advisory Services would be monitored by PMU to provide management with an assessment of its impact on the farms. A monitoring and evaluation section would be established within

Table 7

AGRICULTURAL DELIVERY SYSTEMS
Implementation Schematic



the PMU and would consist of two services, one for data collection and one for data processing. Data collection would be undertaken through four teams of investigators located at Hargeisa, Bonka, Jannale, and Jamame. These teams would undertake continuing random sample surveys in regard to various activities of the NES and FMAS, including the regularity of FEA visits to farmers groups, the intensity of coverage of farmers, the extent of acceptance of recommendations by farmers, and the effectiveness of the state farms organization. Data would be aggregated and processed at the end of each round of surveys and analyzed to indicate overall progress and to reveal areas of weakness.

The ultimate test of the efficacy of the extension service is the effect it would have in increasing crop yields and farmers' incomes. The Monitoring and Evaluation Section would gradually build up a system for gathering information on the variables affecting farmers' incomes. Such variables include crop and animal husbandry practices, input and output marketing channels available to farmers, and storage facilities and techniques. On State Farms, similar information would be gathered to assess their production efficiency, the extent of their contribution to the fulfillment of the country's food production objectives and their financial viability.

The Monitoring and Evaluation Section would undertake reviews of samples of DEO's reports and of successful FEA's, foremen's, and field managers' diaries in order to identify trends and patterns in relation to their work in the field.

Physical and financial information on Project progress would be compiled at the end of every six months and presented to the Technical Coordination Committee to serve as a decisiom-making tool for the MOA. Results of internal monitoring and evaluation by PMU would be sent to IDA within six months of the end of each fiscal year. This would be confirmed by the Government during negotiations.

The information generated through regular reporting and sample surveys would be supported by empirical surveys and ad hoc studies with limited objectives but of relevance to the NES and FMAS. Examples of such studies would include:

1. a monitoring survey (pre-harvest months) of a sample of contact farmers and state farms;

2. An evaluation survey (at harvest time) of a sample of the total farming population; and

3. ad hoc monitoring and evaluation studies such as the performance of DEOs and FEAs in selecting contact farmers, the quality of training sessions, farm practices and case studies regarding the impact of extension on villages.

Two sample surveys (pre-harvest monitoring and harvest time evaluation) would be replicated periodically and would generate time series data, thus allowing for comparisons over time. The ad hoc studies would serve to complete the survey information with a more analytical in-depth exercise. During degotiations, Government would be asked for an assurance that the sample surveys would be carried out following consultation with IDA.

The Central Statistical Department (CSD)

Development of statistics in Somalia is the responsibility of the Central Statistical Department of the Planning Commission. Government requested assistance in undertaking the preparation of a comprehensive statistical development program. Funds provided under the present Project would serve for building the basis for such a program. This would include the provision of technical assistance to identify the weaknesses of the present system and develop an efficient methodology for improving it, training of Somali staff, initiating the buildup of field statistical offices, and starting a limited statistical work program involving such items as a national multi-purpose household survey, an agricultural land use and yield survey and cost structures surveys for various production activities.

In addition to the IBRD-funded evaluation program, AID, utilizing its Mission staff, will conduct annual evaluations of the program. The Mission will utilize PDS funds to participate with the IBRD in their appraisal of Phase II. This appraisal will begin in year 3 of the present project and will include an in-depth evaluation of the current project. The in-depth evaluation of the project will utilize data and information collected by the PMU monitoring and evaluation unit supplemented by limited original field work to define the effectiveness of the project with particular focus on the AID inputs.

This evaluation will broaden the scope of the internal evaluation mechanisms to incorporate social impacts and identification of the level of farmers being affected by the project activities. The evaluation will investigate the involvement of women in the project both as agents of change and as receptors of the message. It will define the family decision making process, the effectiveness of FFAs in transmitting information and directing the decision making process, the relative effectiveness of FMETC graduates or non graduates, changes in consumption patterns due to project activities, effectiveness of non project activities such as the input supply and the marketing system in complementing the project activities, etc.

The evaluation will also recommend modifications in the project design for both the continuing project and for the upcoming phase II to more clearly direct impacts toward AID priority groups such as small farmers,

women, etc. These modifications could range from curriculum changes to changes in the technical packages. It is estimated that one sociologist and one economist for two months and one extension agronomist for one month will be sufficient to undertake this activity.

Conditions, Covenants and Negotiating Status

The Mission recommends the following special conditions for the Project Agreement. Most of these deal with relationships between various donor components with only a minimum of special substantive conditions.

A. Conditions Precedent to Disbursement for the FMETC Component:

Government officially made the 60 ha training farm at Afgoi part of the FMETC, the 400 ha Demonstration State Farm in Jannale part of the FMAS and reserved the two other State Farms in Jannale for use by FMAS during the Project investment period.

B. Covenants

The diplomas and certificates granted by the Afgoi Farm Management and Extension Training Center and the Extension Training Centers at Jannale and Bonka would be officially recognized as a basis for determining the grades, and hence the salaries, of technicians holding them. These diplomas and certificates would allow their holders to accede to the position in the salary scale immediately above the one they occupied then they joined these institutions. Certificates for post graduate training in the U.S. will be accepted and will allow their holders a salary equal to the equivalent diploma.

The Government would appoint the required Somali staff in time to meet the training and operational needs of the Project.

The qualifications and experience of staff internationally recruited for the Project would be satisfactory to AID.

The PMU would submit a training program by March 1980 for approval by AID.

LOGICAL FRAMEWORK

	Narrative	Objectively Verifiable Indicators	Critical Assumptions
GOAL	Increase productivity in the small farmer segment of the Agricultural Sector	1. 180,000 farmers reached by extension. 2. Food production increasing by 10% per year.	1. Increased food production will exceed growth rate of demand thus decreasing exports. 2. Foreign exchange saved or generated will be invested in developmental programs.
PURPOSE	To revitalize the institutional base for delivering technological information and training to farmers	1. 300 FEAs on farms 2. 1500 leading farmers identified and participating. 3. Supervision, follow-up and referral system operational. 4. Feedback occuring.	1. Policies favoring small farmer interventions continue. 2. Research program installed. 3. Input supply and marketing will grow at same pace as extension.
OUTPUTS	1. Enhance management of the extension service. 2. Provide well-trained extensionists. 3. Enhance practicality of training programs. 4. Develop a research strategy.	1. NES staffed and operating 75 FEA per year in intensive courses at ETCs. 2. FMETC staffed and operating 50 students/year coming out. 3. Training curriculum emphasizing field training, 30 interns/year.	1. Adequate numbers of trainees available from Agriculture Secondary School. 2. Professional Somali staff not diverted to other programs.
INPUTS	NES: 1. Technical Assistance. 2. Participant Training. 3. Observation study. 4. Commodities.	 18 person years. 16 person years. 17 person years. $800,000	1. Facilities provided in timely manner. 2. Participants identified in timely manner. 3. All donor funds available to fund needed inputs. 4. Suitable.
	FMETC: 1. Technical Assistance 2. Participant Training 3. Commodities Research Strategy - Technical Assistance	 22.5 person years. 24 person years. $500,000 10 person months.	

ANNEX 2

APPENDIX 5C - AID PROJECT STATUTORY CHECKLIST

Introduction

A. The statutory checklist is divided into three parts: 5C (1) - Country Checklist, 5C(2) - Project Checklist, and 5C(3) - Standard Item Checklist.

B. The Country Checklist, of items affecting the eligibility of the country as a whole, etc., is to be prepared annually, at the time of the first project paper (PP) for the country in a fiscal year. This checklist is then referenced in subsequent PP's, where, in addition, items which have changed are to be brought up to date.

C. The Project Checklist focuses on statutory items which bear directly on the project and are to be included in all PP's.

D. The Standard Item Checklist is intended as a working tool, rather than for inclusion in a project paper. It provides condensed coverage, in checklist form, of statutory matters routinely covered in the project agreement (e.g., 50/50 shipping, etc.). Items from this list should be noted in the PP or added to the project checklist when they require or warrant special treatment or concern.

E. As indicated by their subdivisions, these Checklists are intended for projects funded from Development Assistance and Security Supporting Assistance funds.

F. These Checklists include legislation through FAA amendments made in *the International Development and Food Assistance Act of 1977, enacted August 3, 1977,* the International Security Assistance Act of *1977* ("ISA") enacted *August 4, 1977,* and the Appropriations Act for FY *1978,* enacted October *31, 1977.*

G. These Checklists do not purport to list every conceivable statutory provision which might be relevant, but are intended to provide a convenient reference for provisions which may be of more frequent or more significant relevance.

H. Space has been provided at the right of the Checklist questions for responses and notes. Extra copies of the Appendix may be requisitioned from SER/MO/PAV for use in project development and drafting.

5C(1) - COUNTRY CHECKLIST

Listed below are, first, statutory criteria applicable generally to FAA funds, and then criteria applicable to individual fund sources: Development Assistance and Security Supporting Assistance funds.

A. GENERAL CRITERIA FOR COUNTRY

1. FAA Sec. 116. Can it be demonstrated that contemplated assistance will directly benefit the needy? If not, has the Department of State determined that this government has engaged in consistent pattern of gross violations of internationally recognized human rights?	1. **All AID projects in Somalia have been designed to directly benefit the rural poor population.**
2. FAA Sec. 481. Has it been determined that the government of recipient country has failed to take adequate steps to prevent narcotics drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully?	2. **No.**
3. FAA Sec. 620(b). If assistance is to a government, has the Secretary of State determined that it is not controlled by the international Communist movement?	3. **Yes.**
4. FAA Sec. 620(c). If assistance is to government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) debt is not denied or contested by such government?	4. **No.**
5. FAA Sec. 620(e) (1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, expropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities?	5. **No.**

A

6. FAA Sec. 620(a), 620(f); App. Sec. 107, 114. Is recipient country a Communist country? Will assistance be provided to the Socialist Republic of Vietnam, Cambodia, Laos, Cuba, Uganda, Mozambique, or Angola? — 6. No.

7. FAA Sec. 620(i). Is recipient country in any way involved in (a) subversion of, or military aggression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression? — 7. No.

8. FAA Sec. 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property? — 8. Yes.

9. FAA Sec. 620(l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, inconvertibility or confiscation, has the AID Administrator within the past year considered denying assistance to such government for this reason? — 9. No.

10. FAA Sec. 620(o); Fishermen's Protective Act, Sec. 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing activities in international waters, — 10. N/A.

a. has any deduction required by Fishermen's Protective Act been made?

b. has complete denial of assistance been considered by AID Administrator?

11. FAA Sec. 620(q); App. Sec. 503. (a) Is the government of the recipient country in default on interest or principal of any AID loan to the country? (b) Is country in default exceeding one year on interest or principal on U.S. loan under program for which App. Act appropriates funds, unless debt was earlier disputed, or appropriate steps taken to cure default? — 11.a. No. b. No.

12. FAA Sec. 620(s). "If contemplated assistance is development loan (including Alliance loan) or security supporting assistance, has the Administrator taken into account the percentage of the country's budget which is for military expenditures, the amount of foreign exchange spent on military equipment and the amount spent for the purchase of sophisticated weapons systems?" (An affirmative answer may refer to the record of the taking into account, e.g.: "Yes as reported in annual report on implementation of Sec. 620(s)." This report is prepared at the time of approval by the Administrator of the Operational Year Budget. — 12. N/A.

Upward changes in the Sec. 620(s) factors occuring in the course of the year, of sufficient significance to indicate that an affirmative answer might need review, should still be reported, but the statutory checklist will not normally be the preferred vehicle to do so.)

13. FAA Sec. 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption?

13. No.

14. FAA Sec. 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the AID Administrator in determining the current AID Operational Year Budget?

14. Somalia is not in arrears in payment of U.N. obligations.

15. FAA Sec. 620A. Has the country granted sanctuary from prosecution to any individual or group which has committed an act of international terrorism?

15. No.

16. FAA Sec. 666. Does the country object, on basis of race, religion, national origin or sex, to the presence of any officer or employee of the U.S. there to carry out economic development program under FAA?

16. No.

17. *FAA Sec. 669, 670. Has the country, after August 3, 1977, delivered or received nuclear enrichment or reprocessing equipment, materials, or technology, without specified arrangements or safeguards? Has it detonated a nuclear device after August 3, 1977 although not a "nuclear-weapon State" under the nonproliferation treaty?*

17. No.

B. FUNDING CRITERIA FOR COUNTRY

1. Development Assistance Country Criteria

a. FAA Sec. 102(c), (d). Have criteria been established, and taken into account, to assess commitment and progress of country in effectively involving the poor in development, on such indexes as: (1) small-farm labor intensive agriculture, (2) reduced infant mortality, (3) population growth, (4) equality of income distribution, and (5) unemployment.

1.a. Yes.

b. *FAA Sec. 104(d)(1). If appropriate, is this development (including Sahel) activity designed to build motivation for smaller families in programs such as education in and out of school, nutrition, disease control, maternal and child health services, agricultural production, rural development, and assistance to urban poor?*

1.b. Yes.

5C(2) - PROJECT CHECKLIST

Listed below are, first, statutory criteria applicable generally to projects with FAA funds, and then project criteria applicable to individual fund sources: Development Assistance (with a sub-category for criteria applicable only to loans): and Security Supporting Assistance funds.

CROSS REFERENCES: IS COUNTRY CHECKLIST UP TO DATE? IDENTIFY: HAS STANDARD ITEM CHECKLIST BEEN REVIEWED FOR THIS PROJECT?

A. GENERAL CRITERIA FOR PROJECT.

1. App. Unnumbered; FAA Sec. 653(b); *Sec. 671*

   (a) Describe how Committees on Appropriations of Senate and House have been or will be notified concerning the project; (b) is assistance within (Operational Year Budget) country or international organization allocation reported to Congress (or not more than $1 million over that figure

   a) Project included in FY CP. CN will be submitted.

   b) Yes.

2. FAA Sec. 611(a)(1). Prior to obligation in excess of $100,000, will there be (a) engineering, financial, and other plans necessary to carry out the assistance and (b) a reasonably firm estimate of the cost to the U.S. of the assistance?

   Yes, see Annex 13 of PP.

3. FAA Sec. 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of the assistance?

   NA

4. FAA Sec. 611(b); App. Sec. 101. If for water or water-related land resource construction, has project met the standards and criteria as per *the Principles and Standards for Planning Water and Related Land Resources dated October 25, 1973*?

   NA

5. FAA Sec. 611(e). If project is capital assistance (e.g., construction), and all U.S. assistance for it will exceed $1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?

   NA Construction financed by African Development Fund. No construction financed by A.I.D.

6. FAA Sec. 209, 619. Is project susceptible of execution as part of regional or multilateral project? If so why is project not so executed? Information and conclusion whether assistance will encourage regional development programs. If assistance is for newly independent country, is it furnished through multilateral organizations or plans to the maximum extent appropriate?

   Project is multilateral project. Extension service will draw on regional research for their technical package.

A

7. FAA Sec. 601(a); (and Sec. 201(f) for development loans). Information and conclusions whether project will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture and commerce; and (f) strengthen free labor unions.

a) No.
b) Yes, it revitalizes the private sector agriculture.
c) Cooperatives will be assisted by the FMAS.
d) NA
e) Has positive impacts on Agricultural efficiency
f) NA

8. FAA Sec. 601(b). Information and conclusion on how project will encourage U.S. private trade and investment abroad and encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).

A major proportion of the procurement will be of U.S. source and origin thus reopening trade channels closed several years ago.

9. FAA Sec. 612(b); Sec. 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of contractual and other services, and foreign currencies owned by the U.S. are utilized to meet the cost of contractual and other services.

GSDR will phase into picking up all local costs of the project. IBRD is financing initial local costs but requires establishment of GSDR account for effectiveness.

10. FAA Sec. 612(d). Does the U.S. own excess foreign currency and, if so, what arrangements have been made for its release?

No.

11. *ISA 14. Are any FAA funds for FY 78 being used in this Project to construct, operate, maintain, or supply fuel for, any nuclear powerplant under an agreement for cooperation between the United States and any other country?*

No.

B. FUNDING CRITERIA FOR PROJECT

1. Development Assistance Project Criteria

a. FAA Sec. 102(c); Sec. 111; Sec. 281a. Extent to which activity will (a) effectively involve the poor in development, by extending access to economy at local level, increasing labor-intensive production, spreading investment out from cities to small towns and rural areas; and (b) help develop cooperatives, especially by technical assistance, to assist rural and urban poor to help themselves toward better life, and otherwise encourage democratic private and local governmental institutions?

a) Project supports GSDR policy to re-emphasize the rural private sector. Analysis indicates positive benefits from appropriate technology. See Annex 11.

B1

b. FAA Sec. 103, 103A, 104, 105, 106, 107. Is assistance being made available: [Include only applicable paragraph -- e.g., a, b, etc. -- which corresponds to source of funds used. If more than one fund source is used for project, include relevant paragraph for each fund source.]

(1) [103] for agriculture, rural development or nutrition; if so, extent to which activity is specifically designed to increase productivity and income of rural poor; [103A] if for agricultural research, is full account taken of needs of small farmers;

Project purpose is to provide institution capable of reaching small farmers to increase their productivity.

(2) [104] for population planning or health; if so, extent to which activity extends low-cost, integrated delivery systems to provide health and family planning services, especially to rural areas and poor;

NA

(3) [105] for education, public administration, or human resources development; if so, extent to which activity strengthens nonformal education, makes formal education more relevant, especially for rural families and urban poor, or strengthens management capability of institutions enabling the poor to participate in development;

NA

(4) [106] for technical assistance, energy, research, reconstruction, and selected development problems; if so, extent activity is:

NA

(a) technical cooperation and development, especially with U.S. private and voluntary, or regional and international development, organizations;

(b) to help alleviate energy problem;

(c) research into, and evaluation of, economic development processes and techniques;

(d) reconstruction after natural or manmade disaster;

(e) for special development problem, and to enable proper utilization of earlier U.S. infrastructure, etc., assistance;

(f) for programs of urban development, especially small labor-intensive enterprises, marketing systems, and financial or other institutions to help urban poor participate in economic and social development.

B1b

(5) [107] by grants for coordinated private effort to develop and disseminate intermediate technologies appropriate for developing countries.

c. FAA Sec. 110(a); Sec. 208(e). Is the recipient country willing to contribute funds to the project, and in what manner has or will it provide assurances that it will provide at least 25% of the costs of the program, project, or activity with respect to which the assistance is to be furnished (or has the latter cost-sharing requirement been waived for a "relatively least-developed" country)?

As a multi-lateral project, project is not covered by this section HB 3.

d. FAA Sec. 110(b). Will grant capital assistance be disbursed for project over more than 3 years? If so, has justification satisfactory to Congress been made, and efforts for other financing, *or is the recipient country "relatively least developed"?*

Country is relatively least developed. Assistance is primarily technical assistance.

e. FAA Sec. 207; Sec. 113. Extent to which assistance reflects appropriate emphasis on; (1) encouraging development of democratic, economic, political, and social institutions; (2) self-help in meeting the country's food needs; (3) improving availability of trained worker-power in the country; (4) programs designed to meet the country's health needs; (5) other important areas of economic, political, and social development, including industry; free labor unions, cooperatives, and Voluntary Agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws; or (6) integrating women into the recipient country's national economy.

Project is directed at developing critical extension institution. It is rural oriented and will work with women on the farms.

f. FAA Sec. 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country; utilizes the country's intellectual resources to encourage institutional development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government.

Project supports development of Somalia's manpower to permit them to guide their own destiny in the Agricultural Sector.

e. FAA Sec. 202(a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources?

f. FAA Sec. 620(d). If assistance is for any productive enterprise which will compete in the U.S. with U.S. enterprise, is there an agreement by the recipient country to prevent export to the U.S. of more than 20% of the enterprise's annual production during the life of the loan?

3. Project Criteria Solely for Security Supporting Assistance — NA

a. FAA Sec. 531. How will this assistance support promote economic or political stability?

b. FAA Sec. 533(c)(1). *Will assistance under the Southern African Special Requirements Fund be used for military, guerrilla, or paramilitary activities?*

4. Additional Criteria for Alliance for Progress — NA

[Note: Alliance for Progress projects should add the following two items to a project checklist.]

a. FAA Sec. 251(b)(1), -(8). Does assistance take into account principles of the Act of Bogota and the Charter of Punta del Este; and to what extent will the activity contribute to the economic or political integration of Latin America?

b. FAA Sec. 251(b)(8); 251(h). For loans, has there been taken into account the effort made by recipient nation to repatriate capital invested in other countries by their own citizens? Is loan consistent with the findings and recommendations of the Inter-American Committee for the Alliance for Progress (now "CEPCIES," the Permanent Executive Committee of the OAS) in its annual review of national development activities?

5C(3) - STANDARD ITEM CHECKLIST

Listed below are statutory items which normally will be covered routinely in those provisions of an assistance agreement dealing with its implementation, or covered in the agreement by exclusion (as where certain uses of funds are permitted, but other uses not).

These items are arranged under the general headings of (A) Procurement, (B) Construction, and (C) Other Restrictions.

A. Procurement

1. FAA Sec. 602. Are there arrangements to permit U.S. small business to participate equitably in the furnishing of goods and services financed?	Procurement for goods will be advertized in the [illegible].
2. FAA Sec. 604(a). Will all commodity procurement financed be from the U.S. except as otherwise determined by the President or under delegation from him?	Yes
3. FAA Sec. 604(d). If the cooperating country discriminates against U.S. marine insurance companies, will agreement require that marine insurance be placed in the U.S. on commodities financed?	NA
4. FAA Sec. 604(e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity?	NA
5. FAA Sec. 608(a). Will U.S. Government excess personal property be utilized wherever practicable in lieu of the procurement of new items?	Yes
6. MMA Sec. 901(b). (a) Compliance with requirement that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed shall be transported on privately owned U.S.-flag commercial vessels to the extent that such vessels are available at fair and reasonable rates.	Yes
7. FAA Sec. 621. If technical assistance is financed, will such assistance be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis? If the facilities of other Federal agencies will be utilized,	Title XII university is seen as preferred agent for implementing this project due to their long experience in setting up extension services.

are they particularly suitable, not competitive with private enterprise, and made available without undue interference with domestic programs?

8. International Air Transport. Fair Competitive Practices Act, 1974 — Yes

If air transportation of persons or property is financed on grant basis, will provision be made that U.S.-flag carriers will be utilized to the extent such service is available?

B. Construction

1. FAA Sec. 601(d). If a capital (e.g., construction) project, are engineering and professional services of U.S. firms and their affiliates to be used to the maximum extent consistent with the national interest? — NA

2. FAA Sec. 611(c). If contracts for construction are to be financed, will they be let on a competitive basis to maximum extent practicable? — NA

3. FAA Sec. 620(k). If for construction of productive enterprise, will aggregate value of assistance to be furnished by the U.S. not exceed $100 million? — NA

Other Restrictions

1. FAA Sec. 201(d). If development loan, is interest rate at least 2% per annum during grace period and at least 3% per annum thereafter? — NA

2. FAA Sec. 301(d). If fund is established solely by U.S. contributions and administered by an international organization, does Comptroller General have audit rights? — NA

3. FAA Sec. 620(h). Do arrangements preclude promoting or assisting the foreign aid projects or activities of Communist-Bloc countries, contrary to the best interests of the U.S.? — Yes

4. FAA Sec. 636(i). Is financing not permitted to be used, without waiver, for purchase, long-term lease, or exchange of motor vehicle manufactured outside the U.S. or guaranty of such transaction? — Yes

C

5. Will arrangements preclude use of financing:

a. FAA Sec. 114. to pay for performance of abortions or to motivate or coerce persons to practice abortions, *to pay for performance of involuntary sterilization, or to coerce or provide financial incentive to any person to practice sterilization?* — Yes

b. FAA Sec. 620(g). to compensate owners for expropriated nationalized property? — Yes

c. FAA Sec. 660. to finance police training or other law enforcement assistance, except for narcotics programs? — Yes

d. FAA Sec. 662. for CIA activities? — Yes

e. App. Sec. 103. to pay pensions, etc., for military personnel? — Yes

f. App. Sec. 105. to pay U.N. assessments? — Yes

g. App. Sec. 106. to carry out provisions of FAA Sections 209(d) and 251(h)? (transfer to multilateral organization for lending). — Yes

h. App. Sec. 112. *to finance the export of nuclear equipment, fuel, or technology or to train foreign nationals in nuclear fields?* — Yes

i. App. Sec. 501. to be used for publicity or propaganda purposes within U.S. not authorized by Congress? — Yes

ANNEX 3

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DE RUEHC #0512 0371224
ZNR UUUUU ZZH
R 05194 IZ FEB 79
FM SECSTATE WASHDC
TO RUQMDI/AMEMBASSY MOGADISCIO 3647
INFO RUVQC/AMEMBASSY NAIROBI 8860
BT
UNCLAS STATE 030512

ACTION COPY
Action taken: _____
_____
_____
No action
Initials _____

AIDAC

E.O. 12065 N/A

TAGS:

SUBJECT: PID APPROVAL: AGRICULTURE DEVELOPMENT SYSTEMS PROJECT 649-0112

1. SUBJECT PID SUCCESSFULLY REVIEWED AND APPROVED 12 JANUARY AT MEETING ATTENDED BY WORLD BANK STAFF. MISSION IS COMMENDED ON RAPID DEVELOPMENT OF PID WHICH COMMITTEE FOUND TO BE WELL PREPARED AND MOST DESCRIPTIVE OF PROJECT ELEMENTS PROPOSED FOR AID FINANCING. COMMITTEE RECOMMENDS THAT PP TEAM BE FIELED AS SOON AS POSSIBLE SO AID MAY MOVE FORWARD IN CLOSE COORDINATION WITH WORLD BANK TOWARD FINAL PROJECT APPROVAL AND IMPLEMENTATION.

2. BANK PLANS TO NEGOTIATE ITS CREDIT WITH GSDR AT MEETING IN WASHINGTON MARCH 5/9, SAME DATES AS ITS MEETING ON CENTRAL RANGELANDS PROJECT. AID HAS BEEN INVITED TO OBSERVE AT BOTH MEETINGS. BANK PLANS TO GO TO ITS BOARD WITH F-NAL AGREEMENT MAY 15 AND SIGN THE BANK/GSDR AGREEMENT IN JUNE. WE PLAN FIELD AID/PP TEAM IN FEBRUARY WITH GOALS OF HAVING DRAFT FAR ENOUGH ADVANCED TO SUPPORT OUR PARTICIPATION IN DONOR'S MEETING TENTATIVELY PLANNED FOR MOGADISCIO END MARCH. ACTUAL DATE DEPENDS LARGELY ON WHEN WE FEEL ARE READY TO MEET WITH OTHER DONORS. THEREFORE COORDINATION OF PP PREPARATION OF BOTH RANGELANDS PROJECT AND AGRIC SYSTEMS IS VITAL TO CONVENING OF DONOR'S MEETING. WE ARE ALSO REQUESTED TO NOTIFY BANK BY LETTER IN FIRST WEEK OF FEBRUARY EXPRESSING OUR CONTINUED INTEREST IN AGRIC SYSTEMS PROJECT. WE PREPARING LETTER. FOLLOWING ARE POINTS COMMITTEE WISHES PP TEAM TO ADDRESS AS IT REVIEWS BANK'S PROJECT ANALYSIS AND DEVELOPS PP FOR AID PORTION OF PROJECT:

A. A MECHANISM NEEDS BE DEVELOPED WITHIN THE PROJECT TO ASSURE DEVELOPMENT OF A LINKAGE AND RELATIONSHIP BETWEEN RESEARCH AND EXTENSION. EXTENSION SERVICE MUST BE CAPABLE OF IDENTIFYING AND FEEDING BACK TO RESEARCH LEVEL ITS REQUIREMENTS. A TASK AND OUTPUT OF THE PROJECT SHOULD BE THE DEVELOPMENT OF A RESEARCH STRATEGY AND DEFINITION OF RESEARCH NEEDS WHICH COULD FORM THE BASIS OF A COMPANION PROJECT TO BE DEVELOPED AT A LATER DATE.

B. AN EXTENSION LIVESTOCK ADVISOR SHOULD BE ADDED TO THE LONGTERM TECHNICAL ASSISTANCE TEAM. IT IS FELT SUCH AN ADVISOR COULD HELP BRIDGE THE GAP NOW EXISTING BETWEEN PROGRAMS OF THE MINISTRY OF AGRICULTURE AND MINISTRY OF LIVESTOCK.

C. OUR AID RESOURCES MUST CLEARLY BE FOCUSED ON TRAINING OF EXTENSION AGENTS WHO WILL WORK WITH SMALL FARMERS WITH BENEFITS TO BE DERIVED BY FARM MANAGEMENT SERVICE TO BE MINIMAL. IT MUST ALSO BE CLEAR THAT VEHICLES EQUIPMENT ASSIGNED TO SUPPORT OF EXTENSION SERVICE AND ITS WORK WITH SMALL FARMERS CANNOT BE DIVERTED TO STATE FARMS.

D. IT IS RECOMMENDED THAT PROJECT BE IMPLEMENTED THROUGH UNIVERSITY CONTRACT AS THE TA SKILLS REQUIRED ARE MOST APPROPRIATELY FOUND IN THE UNIVERSITY COMMUNITY. HOWEVER BECAUSE OF THE SHORT TIME FRAME WITHIN WHICH PREPARATION OF THE PP MUST FALL, AND AS THE PROJECT IS REALLY ESSENTIALLY ALREADY DESIGNED, IT IS NOT RECOMMENDED THAT THE TITLE XII MECHANISM BE USED TO ASSIST IN DEVELOPMNET OF PP.

4. WILL ADVISE COMPOSITION OF TEAM AND ETA ASAP. VANCE
BT
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ANNEX 4

JAMHUURIYADDA DIMOQRAADIGA SOOMAALIYA
/MINISTRY OF AGRICULTURE/

TF/100/20 76/79-

Lam. _____ Waxaa ku xiran _____

Jawaabta warq. L. _____

oo _____

Ujeeddo:

Mogadishu, 21/5/79.

Mr. Charles P.Campbell
Mission Director
USAID/SOMALIA.

CC: Ministry of Finance
Mogadisho.

CC: State Planning Commission.
Mogadishu.

Dear Mr. Campbell

We are happy to have USAID"Participation in the Multidonar Agricultural Extension and Farm Management Training Project through your Agricultural Delivery Systems Project. We feel that this project to strengthen our Extension Service and Farm Management Service by providing well Trained Staff in a Central piece of our Development program.

The AID contribution of $7,752,000 to Finance the non Civil Work Items of the National Extension Service and Farm Management and Extension Training Center is Particularly Important since these Components will be the Progrem to reach out to our many thousand private Farmers. The Technical training and Commidities provided for by AID Project are Warmly Welcomed and will very effectivelty compliment the contributions from the IRBD,ADF and EEC.

Sincerely yours,

Mohamed Abuukar Shek
Director General.

WAASAARADDA BEERAHA

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ANNEX 5

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Department of State

INCOMING TELEGRAM

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ACTION AID-31

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O R 291351Z JUN 79
FM AMEMBASSY NAIROBI
TO AMEMBASSY MOGADISCIO IMMEDIATE
SECSTATE WASHDC 8732

UNCLAS NAIROBI 11414

AIDAC

FROM REDSO/EA

E.O. 12065: N/A
SUBJ: AGRICULTURAL DEVELOPMENT SYSTEM 611 (A) DETERMINATION

REF (A) MOG 2296 (B) NAIROBI 11205 (C) MOG 2251

REDSO ENGINEER WAS NOT AWARE THAT HOUSING PLANS PROPOSED FOR AG EXT. PROJECT 0101 ARE SAME AS PROPOSED FOR SUBJECT PROJECT. SUBJECT TO INCORPORATION OF MODIFICATIONS SUGGESTED IN REDSO ENGINEER MEMO DATED 5/23/1979 IGSDR STANDARD TYPE A HOUSING PLAN NO. SOM 45 ARE ALSO APPROVED FOR SUBJECT PROJECT. REDSO APPROVAL OF FINAL PLANS AND SPECIFICATION WILL BE ACQUIRED PRIOR TO CONSTRUCTION. SUBJECT TO THIS 611(A) DETERMINATION SATISFIED.
BLANE

6 ACTION
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ANNEX 6

PROJECT AUTHORIZATION AND REQUEST FOR ALLOTMENT OF FUNDS

PART II

Name of Country/Entity: Somalia Name of Project: Agricultural Delivery Systems

No. of Project: 649-0112

Pursuant to Part___, Chapter____, Section____ of the Foreign Assistance Act of 1961, as amended, I hereby authorize a Grant to Somalia the "Cooperating Country" of one million five hundred thousand United States Dollars ($1,500,000) (the "Authorized Amount") to help in financing certain foreign exchange and local currency costs of goods and services required for the project as described in the following paragraph.

The Project consists of a program to revitalize the National Extension Service in Somalia. AID's contribution to this multi-donor (IDA, ADF, EEC, AID) project consists of providing the Technical Assistance, training and commodities required for the National Extension Service, the Farm Management and Extension Training Center and two Extension Training Centers. The purpose of the project is first to install a working extension service and secondly to provide properly trained staff to operate the extension service so that improved technologies can be delivered to small farmers in Somalia.

I approve the total level of A.I.D. appropriated funding planned for this project of not to exceed seven million seven hundred fifty two thousand United States Dollars ($7,752,000), Grant including the funding authorized above, during the period FY 1979 through FY 1982. I

approve further increments during that period of Grant funding up to $6,252,000, subject to the availability of funds in accordance with A.I.D. allotment procedures. I hereby authorize the initiation of negotiation and execution of the Project Agreement by the officer to whom such authority has been delegated in accordance with A.I.D. regulations and Delegations of Authority subject to the following essential terms and covenants and major conditions; together with such other terms and conditions as A.I.D. may deem appropriate:

| Source and Origin of Goods and Services

Except for Ocean Shipping, goods and services financed by A.I.D. under the project shall have their source and origin in the Cooperating Country or in the United States or in countries included in A.I.D. Geographic Code 941 except as A.I.D. may otherwise agree in writing.

Conditions

Prior to any disbursement, or the issuance of any commitment documents under the Project Agreement to finance the FMETC Borrower/Grantee shall furnish in form and substance satisfactory to A.I.D. proof that the 60 hectare farm has been allocated to FMETC.

Covenants

Borrower/Grantee shall covenant:

1. The diplomas and certificates granted by the Afgoi Farm Management and Extension Training Center and the Extension Training Centers at Jannale and Bonka would be officially recognized as a basis for determining the grades, and hence the salaries, of technicians holding them. These diplomas and certificates would allow their

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holders to accede to the position in the salary scale immediately above the one they occupied when they joined these institutions. Certificates for post graduate training in the U.S. will be accepted and will allow their holders a salary equal to an equivalent diploma.

2. The Government would appoint the required Somali staff in time to meet the training and operational needs of the Project.

3. The qualifications and experience of staff internationally recruited for the Project would be satisfactory to A.I.D.

4. The PMU would submit a training program by March 1980 for approval by A.I.D.

Waivers

The following waivers to A.I.D. regulations are hereby approved:

Light passenger vehicles may be purchased on a proprietary basis from the same supplier who supplies the vehicles for Project 0101.

Clearances:	Name	Office Symbol	Date	Initials

Signature _____
Goler T. Butcher
AA/AFR

ANNEX 6A

Project Vehicle Standardization Request

TO: SER/COM

FROM: USAID/Somalia

SUBJECT: Approval for Project Vehicle Standardization

REFERENCE: PIO/C 649-0101-9-00001

As we have previously informed SER/COM, in Somalia there are no U.S. vehicle manufacturer's representative or maintenance facilities or spare parts support for U.S. vehicles. Due to this problem, the Government of Somalia and USAID/Somalia decided that, rather than request a source/origin waiver to purchase project vehicles from Code 935 countries, we would standardize on a single US manufacturer and require that the supplier establish the needed facilities. Based on the manufacturer that receives the award for project vehicles under PIO/C 649--0101 S-8000, a project vehicle standardization plan for utility vehicles and passenger vehicles would be instituted. The intent to use this award as a basis for establishing a vehicle standardization plan for vehicle procurements in other AID projects was expressed in section L-2 of the PIO/C (see attachment). Further, the PIO/C gives favorable consideration to manufacturers which give a firm commitment to establish a local representative (see attachment).

On _____, 1979, AAPC, Inc., informed the Government of Somalia and USAID/Somalia that the award for project vehicles purchased under PIO/C-0101-9-00001 was awarded to _____. Also, _____ has made a firm commitment to

establish a local representative in Somalia who shall be able to give adequate local service, spare parts and warranty backstopping.

With this firm commitment by _____, the Government of Somalia and USAID/Somalia request SER/COM's approval to allow the standardization of all project utility vehicles and passenger vehicles to be those that are manufactured by _____.

ANNEX 7 - National Extension Service (NES)

General

The revitalization of the extension service is the most critical of components of the delivery system. The NES is the institution responsible for direct interaction with farmers and thus is the primary agent of change in the system. It is essential that the NES be made functional if there is to be progress in increasing productivity among small farmers.

In a culture such as found in Somalia with a strong oral tradition and only a recently introduced literacy, the only effective means to reach farmers is a direct person-to-person approach. The person-to-person approach requires intensive application of Somalia's scarcest resource, trained manpower. Therefore, a pyramidal structure has been designed which provides for small numbers of highly trained staff supervising and assisting a large number of less well trained agents with constant and continual retraining and follow-up.

The key to making this system effective is proper training at all levels directed at instilling the concept of a practical demonstration oriented "hands on" approach to taking the message to farmers. The project supports several units at different levels to accomplish the required training. It also provides the technical assistance necessary to develop and implement the supervision, follow up and referal system required when less than perfectly trained staff as used as field agents.

Start-up Program

Lack of adequately qualified trained manpower is a serious constraint in satisfactorily organizing the extension program during the early years. The thrust of the project would be on setting up training facilities for upgrading the technical extension and farm management expertise through the FMETC and ETCs. Once these institutions become operational, they would provide a steady flow of trained personnel for managing the extension and farm management services. Building up of these institutions would inevitably be a slow process, however, as the first set of trainees would be expected to become available only by year 4 of the project period.

Pending the unavoidable time requirements for building up the number of trained personnel, it is proposed to initiate the program on a modest scale with the use of existing untrained manpower from year one. In this manner, benefits would start flowing to farmers, to the extent possible, right from the beginning of the project period and would not have to wait for the ideal situation to be built up. Available manpower would be carefully screened before their deployment in the start up program. Three internationally recruited specialists including the Technical Director of the National Extension Service and his assistants, the Crop Production and the Plant Protection Specialists would be placed in position from the start to guide the program. Only a limited area with a manageable size of staff would be covered and tight management procedures would be built up so that the internationally recruited staff can provide training and guidance to the Somali field staff on an intensive basis, thus making up for the shortfall in training. The internationally recruited staff with assistance

of the staff of the Central Research Station would undertake periodic on-the-job training for the regional and field level staff once every two weeks and would supervise their field work with the farmers. Intensity of involvement of the internationally recruited staff in the limited area would partially make up for the initial lack of training. The program would be merged into the regular project activities as soon as trainees from the FMETC and the ETCs start flowing into the fields. The start up program would, in the meantime, have generated a very valuable fund of first hand experience in regard to the proposed extension approach, providing at the same time a forum for practical training of extension personnel before their deployment in other regions/districts.

It is proposed to limit the start up program to only one district each year until year 4 when trained personnel would become available. The most promising irrigated as well as rainfed areas in the proximity of the National Extension Service headquarters at Afgoi would be covered to permit convenient effective supervision from the headquarters. The proposed phasing would be as follows:

Year	District	Irrigated Rainfed	Farm Families	FEAs Req'd.	DEOs Req'd.	Regional Officers Required
1	Afgoi (Lower Shebelli Region)	Irrigated	15,000	30	4	3
2	Baidoa* (Bay Region)	Rainfed	23,000	40	5	3
3	Jannale (Lower Shebelli Region)	Irrigated	9,000	18	2	-
4	Bur-Akaba (Bay Region)	Rainfed	15,000	24	3	-

*A.I.D. Project 0101 already active in the Baidoa area will have begun an intensively supervised extension program prior to the intervention of the NES. As the NES becomes functional the pilot activity will compliment the NES actions by providing more intensive regional supervision than is possible from NES central office.

In all, four districts in two regions would be covered during four years. The Somali staff for the districts in Bay region would be given initial on-the-job training by being attached to the program in Afgoi district or through project 0101 during year 1 before start of the program in

the district of Baidoa in year 2. The same would apply to the other districts. The start-up program would thus allow to initiate extension work in some of the most promising irrigated as well as rainfed areas right from year 1.

Training of Extension Personnel

Effectiveness of extension effort depends on the quality of know-how and technical competence of the extension personnel at various levels. It would, therefore, be necessary to back up the extension program with a continuous process of training at various levels to progressively upgrade the technical skills of the personnel and keep them abreast of new developments. A comprehensive integrated training program would thus be an essential ingredient of the overall extension effort. The program would start with a two-year pre-service training in basic practical agriculture for Regional and District level supervisory officers at the FMETC and for field level extension agents at the ETCs. The training process would continue through in-service refresher courses from time to time and periodic on-the-job training at regular monthly intervals for supervisory staff and bi-weekly intervals for field agents. The in-service and on-the-job training would provide specific training in regard to practices of immediate relevance to be extended to farmers at a given period of time and would be the basic source of strength for the system. Overseas training at the graduate level followed by on-the-job experience would be provided for counterparts of internationally recruited staff to enable them to take over full responsibility for the Extension Service towards the end of the project period.

Periodic On-the-job Training

Field-Level extension agents

The proposed intensive extension approach relies for its impact, basically, on the regular visit by the FEA to each of 8 farmer groups in his/her circle at fixed time and day every week. The FEA is technically equipped for these visits through a continuous process of training every two weeks. The entire system is geared to this rigid schedule. Each two weeks on a fixed day, the FEAs along with their supervisors the DEOs would be given practical training by the REO and his/her assistants, the Crop Production and Plant Protection Specialists. The training would be concentrated on the few specific recommendations relevant to farming operations likely to take place in the following two weeks. This makes training timely, relevant and meaningful. The periodic on-the-job training is the most critical of the training programs, and efforts would be concentrated on making it effective. The training would be practically oriented, giving all opportunity to the trainees for practical work with their hands so that they would have full confidence in passing the recommendations to the farmers. A mimeographed lesson, listing the recommendations to be followed in the coming two weeks in clear specific terms along with other literature and audio-visual aids would be given to

the trainees. At these sessions the FEA would have the opportunity to raise and discuss problems brought up by farmers during his/her visits to the fields. The training sessions would be limited to groups of about 30 FEAs along with the concerned DEOs. Staff from the research station and ETCs would participate.

The bi-weekly training sessions for the extension agents also provide an opportunity to ensure coordination between the extension service and input supply agencies and, ultimately, credit and marketing agencies. The FEAs would be able to assist the concerned agencies in a realistic assessment of requirements for inputs and credit in their areas, based on recommendations being made by them and their likely acceptance by the farmers. Effective coordination with the concerned agencies would be ensured by inviting their local representatives to the bi-weekly training sessions for about one hour as and when needed.

Regional Officers

Periodic on-the-job training would be given on similar lines to all the regional officers including the Regional Extension Officer and the Crop Production and Plant Protection Specialists by the headquarters staff and research scientists for a period of two days at the beginning of each month. The training would be conducted under the personal supervision of the Technical Director of the National Extension Service. Besides technical training, it would provide for planning and general review of progress of the extension program. The aim would be to build a high level of technical competence in the regional officers so that they may work with confidence as trainers for the field staff. The training would be held at the FMETC and would use the facilities at the FMETC training farm and the Central Research Station as needed. It would be practical and concentrate only on recommendations of immediate relevance. Scientists from the Research Station and teaching staff from the Agricultural Faculty and from the FMETC along with the Communication Specialist would participate. Headquarters specialists would prepare the lessons for each training session in close consultation with the research scientists. The training received at these sessions would be transmitted down the line to the field workers at the bi-weekly field level training sessions in the regions.

Other On-the-job Training

Seasonal Training

In addition to the periodic training at the regional level and at headquarters, comprehensive training sessions would also be held at each level at the beginning of each season. The training would last 2-3 days, and would provide the concerned trainees with an overview of recommendations concerning the various crops for the whole season, thus enabling them to better understand the logic behind the training given in the periodic training sessions. The seasonal training sessions would emphasize the overall extension goals and priorities. Experts from the Central and regional research stations and instructors from the FMETC/ETCs would participate in the training.

Orientation Training

As the extension system is introduced in new areas, it is important that the concerned staff thoroughly understand the proposed approach to extension and the ways to make their efforts effective. Such training would give the concerned personnel confidence in dealing with farmers, and lend momentum to the program right from the start. The training should cover 3-4 days. Trainers would be headquarters staff as well as field staff drawn from areas where the program has already been introduced. Training would be based on actual field experience.

Institutional Training

Pre-service Training - FEAs

About 368 FEAs would be required over a period of 7 years for making the Extension Service operational nationally at the field level. Around 310 of them would be trained during the project period. Potential FEA candidates would be recruited among people having finished intermediate level schooling. A selection committee under the chairmanship of the Technical Director of the National Extension Service with Crop Production and Plant Protection Specialists and the REO as members would scrutinize the candidates suggested by the DEOs to be accepted for training and subsequent induction into the service. These would be given thorough training in practical agriculture. The ETCs at Jannale (irrigated agriculture) and Bonka (rainfed agriculture), would be reorganized and strengthened for imparting this training. The course would cover a period of two years and provide for training in three steps. The first step covering 6 months would provide classroom grounding in agriculture along with practical work on the training farm at each of the ETCs. This would be followed by 14 months training on the job through two cropping seasons, both "Gu" and "Der", under rainfed as well as irrigated conditions. The trainees thus matured from exposure to the field would be brought back to the classroom for three months for a roundup course and examinations. The trainees would receive a certificate in Agriculture Extension upon completion of the course. While attending the ETCs, the trainees would be required to undertake practical work with their hands for about two hours every morning, and would thus be fully involved in the growing of the crops at the training farm. Classroom training would at the same time ensure a grounding in the basics of agriculture. The course would include regular visits to research stations. ETCs at Jannale and Bonka would be suitably equipped with staff and other facilities under the project. Staff from regional research stations and regional extension service would be utilized as guest faculty. Project costs included provision for this training.

Pre-service Training - Supervisory Staff

Supervisory staff required at district and regional levels as well a staff for the ETCs would be found by deployment of promising existing staff to the extent possible and by recruitment of fresh faculty/secondary school graduates. The regional staff and principals of ETCs would be

faculty graduates while DEOs in the districts and instructors at ETCs would be Agricultural Secondary School graduates. The candidates for training would be carefully screened by a Selection Committee under the chairmanship of the Project Manager with the Principal of the FMETC and the Director of the National Extension Service as members. Both the existing staff and the fresh recruits would require exposure to practical agriculture and extension and management techniques. Training would be undertaken at the FMETC and would cover a period of two years. This training also would be in three stages to provide for a balanced mix of classwork and field work. The first 10 months would be utilized for classwork with practical work on the Training Farm at the FMETC. This would be followed by 11 months of supervised internship and two months of roundup and examinations. The trainees would be continuously exposed to research work at the Central Research Station. Research staff, staff from the Faculty of Agriculture and the Agricultural Secondary School along with the technical and communication specialists from the National Extension Service and the Farm Management Advisory Service would be utilized as guest instructors.

Special Technical Training

The regional officers and instructors at the ETCs play a critical role in providing training and technical support to the field agents. Special attention would have to be given to upgrading their technical competence on a continuing basis to enable them to effectively guide the field agents. The specialists would receive one or two weeks intensive training at the beginning of each season in subjects related to their speciality. In addition, special courses ranging from one to several weeks duration would be organized at the FMETC to cover a variety of subjects and crops. Examples of such courses would be: improved plowing practices, better use of hand tools, use of ox/drawn implements, pest and disease control for different crops, etc. The program for special courses would be drawn up by the Training Program Officer.

In-Service Refresher Training

It would be necessary to bring the FEAs and DEOs to the ETCs for in-service refresher training for about one month every two years to ensure upgrading of their knowledge and skills, so that they are kept abreast of the latest technical developments. The course would include refresher training in extension techniques. Staff from research stations and regional extension offices would participate.

Overseas Training

Funds would be provided under the project for overseas training at the Master of Science level in suitable courses for counterpart staff working with the internationally recruited staff so that they may, upon return and after reasonable experience on the job, take over responsibility for the Project. The Project would also include provision for short-term training abroad of officers from the National Extension Service, Farm Management Advisory Service and senior Ministry of Agriculture personnel on some successful Bank financed extension projects and other relevant sites.

Physical Requirements for the NES

Offices for the National Extension Service would be required at the headquarters at Afgoi and in the regions. All extension staff would be required to perform arduous duties involving frequent field trips. Housing facilities close to their areas of operation would be particularly important for the field level DEOs and FEAs so that they may live within their areas of work and thus be available for contact by the farmers at all times. The project would provide for office and housing for staff at all levels. A key feature of the proposed methodology and its organization is the requirement that the entire staff spend most of their time in the field. Each week, the FEA would spend four days for visits to farmer groups, and a fifth day for field trials, demonstrations and other miscellaneous jobs. DEOs would spend at least four days a week with the FEAs. The regional officers would be expected to devote two or three days a week for supervising and guiding the work in the field. Trarsportaion is thus crucial to the success of the program. The Extension Service would need a bicycle for every FEA (360), a motorcycle for every DEO (52), and two 4-wheel vehicles for each of the five major regions and one each for the other 5 regions (15). Each ETC would need a tractor-trailer and a 4-wheel drive pick-up along with animal drawn implements and equipment for the workshop. The project would provide for the needs of the Extension Service during the 5 year project period. At the National Extension Service headquarters the project would provide for one 4-wheel drive vehicle for the Director of the National Extension Service, two 4-wheel drive vehicles jointly for the Crop Production and the Plant Protection Specialists and the Training Program Officer, one long-wheel base 4-wheel drive vehicle for the Communication Specialist and two motorcycles for the whole unit. Motorcycles and bicycles would be sold on interest free credit to DEOs and FEAs respectively. Regional staff would also be eligible for motorcycle loans. The roll over from these loans will be utilized for financing additional vehicles. Adequate allowance would be provided to compensate extension staff for their maintenance and travel expenses. Project costs include the costs of additional vehicles, their operating costs and travel allowances.

Equipment would be provided for printing and publication of extension literature and preparation and use of audio-visual aids. A printing press, two cameras along with a photo-laboratory, two super 8 mm film projectors, two slide projectors, and one duplicating machine along with other miscellaneous equipment would be provided at headquarters. One camera, two super 8 mm projectors, one slide projector and one duplicating machine would be provided at each regional headquarters. One camera, one super 8 mm projector, one slide projector, one overhead projector and one duplicating machine and other training aids would be provided at each ETC. Material and equipment required for DEOs and FEAs for setting up demonstrations and other extension work would be provided. The Project would provide funds for purchase of equipment and operating costs. The ETCs at Bonka and Jannale would be rehabilitated and equipped.

Bonka. There are a number of existing buildings including workshops, tool sheds, chicken coops, grain storage bins, a classroom dining room combination, dormitory, and sundry small utility buildings. A new workshop is under construction. There should be some renovation of the present buildings and construction of housing, classrooms, and sheds. All in all there would be 24 new buildings, 15 of which would be local houses of thatch and mud. The rest would be of reinforced concrete and block construction. There is an existing well with pump, a small storage reservoir and a distribution system to the various buildings. In addition to the present Farmers Training Center, this well serves the surrounding area. Accordingly, a new well with adequate distribution and pumping equipment would be installed for the exclusive use of the Bonka Training and Research complex. Annex 5, Table 4 shows the details of the above described proposed facilities.

Jannale. As in Bonka, there are a number of existing building, but they have not been used for more than a year. It will, therefore, be necessary to do a considerable amount of rehabilitation, especially to the roofs, which presently show signs of extensive leakage. Furthermore, it would be necessary to construct housing, a generator building, a library, a workshop, toilet facilities, an animal shed and an open general purpose shed. There is also a well but it hasn't been used for some time. A new well would be drilled and equipped with adequate pumping equipment. Details of the required facilities are listed in Annex 12, Table 5.

Technical Assistance for NES

Besides the academic qualifications, the most important criteria for selecting the technical assistance for the National Extension Service is the familiarity with the in-field application of extension methodologies along the lines suggested in the report. The internationally recruited staff should be capable of working with LDC people in a disciplined framework, they should be capable of training people to work in such framework and they should be capable of securing the cooperation of the Somalis for adapting the proposed extension methodology to local conditions. The role of the internationally recruited staff would be to train Somalis and assist them in building a solid basis for their National Extension Service. The intention is clearly not for the internationally recruited staff to set up an Extension Service for the Somalis but rather to assist them in developing their own.

Suggested Terms of Reference for the Post of Director of NES

Duties and Responsibilities

Under the direction of the Project Manager, the Technical Director, NES, would be responsible for organization and day-to-day operation of the NES. He would be assisted by a team of officers including a

Crop Production Specialist, a Plant Protection Specialist, a Communications Specialist and a Training Program Officer at the headquarters at Afgoi, and staff for field work at the region, district and field levels.

Among the primary responsibilities of the Director, NES would be the following:

(a) establish close coordination with the research stations with assistance of the Crop Production and Plant Protection Specialists for identification of recommendations considered suitable for extension in respect of various farming activities;

(b) supervise the preparation of extension publications and audio visual materials with assistance of the Communications Specialist/

(c) organize a well considered comprehensive program with assistance of the Training Program Officer for pre-service training of extension personnel at various levels before their induction into the service, periodic on-the-job training of regional and field level staff, and refresher training for continuous upgrading of knowhow at all levels;

(d) supervise the organization of a program of field visits in accordance with a fixed schedule for staff at various levels, and arrange for its tight step-by-step supervision;

(e) organize reporting and monitoring procedures within the service, and assist in evaluation of effectiveness of the program;

(f) assist with the recruitment and evaluation of extension personnel; and

(g) assist with the preparation of periodic reports to the Director General of MOA and the financing agencies.

Qualifications

The candidate would be a University Graduate with specialization in Agricultural Extension. A more essential requirement would be the candidate's practical agricultural experience both in smallholder low rainfed and in irrigated crops in tropical areas and his/her proven ability in directing agricultural extension services at various levels. A high level of managerial ability would be needed and should be given considerable weight in candidate selection.

Suggested Terms of Reference for Farming System/Plant Protection Specialists

Duties and Recommendations

It will be the responsibility of the Crop Production/Plant Protection Specialists to ensure a high level of technical support to the extension

program in the field. They will be responsible, under the supervision of the Technical Director, NES, to assist him as a team in developing an effective strategy for identifying relevant technical improvements in farming operations, and in promoting their widespread implementation.

Among the duties of the Crop Production/Plant Protection Specialists would be the following:

(a) establish close coordination with CARS for identification of recommendations considered suitable for extension to farmers;

(b) assist in the preparation of materials for extension publications and audio visuals for support of the program;

(c) train technical officers at regional level, and supervise training of field level extension personnel by the regional officers, under a periodic fixed step-by-step schedule, and ensure a high level of technical excellence at all levels;

(d) ensure effective follow-up of implementation of the program in the field through continuing supervision of work on the farmers fields; and

(e) assist in setting up a comprehensive program of pre-service and in-service training of extension personnel at all levels, and assist FMETC as guest faculty from time to time.

Qualifications

The candidates would be University Graduates in Agriculture preferably at the MSc level with specialization in Agronomy/Plant Protection. A more essential requirement would be practical agricultural experience in small-scale low rainfed and irrigated crops in tropical areas and experience in extensive work with low-level technology and with small farmers, over a considerable period of time.

Suggested Terms of Reference for Communications Specialist

Duties and Responsiblities

Under the supervision of the Technical Director, NES, the Communications Specialist would be responsible for organizing communications support to the extension program in the field. The Communications Specialist would assist the Technical Director, NES, in setting up a comprehensive well considered communications program in support of person-to-person extension effort, including printed material and audio-visual, etc.

Duties of the Communications Specialist would include the following:

(a) setting up and operating the infrastructure facilities, including printing and photographic equipment and laboratory;

(b) define the requirements of NES in terms of a suitable mix of communications equipment to meet its needs at all levels and ensure the effective utilization of such equipment according to a well drawn program;

(c) set up effective procedures for maintenance of communications equipment by the Somali personnel through training; and

(d) participate in training programs in fields of general extension and communications at the FMETC, guide similar training programs for field level personnel at the ETCs and participate in workshops and seminars for training of Somali personnel in general extension and communications.

Qualifications

The candidate would be a University Graduate with specialization in agricultural extension education/communications. He/she should possess wide experience in use of communications facilities of various types in support of agricultural development programs preferably with smallholder farmers in developing countries. He/she should have suitable technical qualifications in communications and should have experience in programming the use of equipment and in ensuring proper maintenance and repairs of communications equipment.

SOMALIA

AGRICULTURAL EXTENSION AND FARM MANAGEMENT TRAINING PROJECT

PHASING OF START OF EXTENSION WORK

(AFTER ONE YEAR TRAINING OF SUPERVISORY STAFF AND SIX MONTHS' TRAINING OF FEAs)

Region/District	Farm Families	FEAs	DEOs	BECs	RCPO 1/	RPPO 2/
Year 4 1/2						
1. Middle Shebelli Region				1	1	1
1. District Jowhar	11,000	22	3			
2. District Balad	9,000	18	2			
	20,000					
2. Lower Shebelli Region				1	1	1
1. District Afgoi	15,000	30	4			
	35,000	70	9	2	2	2
Year 5						
3. Bay Region				1	1	1
1. District Baidoa	23,000	40	5			
2. District Kansadere	7,000	10	2			
3. District Dinsor	8,000	10				
4. District Burukaba	15,000	24	3			
	53,000	84	11	1	1	1
Year 5 1/2						
Lower Shebelli Region (contd)						
2. District Merca	17,000	34	4			
3. District Koryole	11,000	22	3			
4. District Janle Wein	9,000	18	2			
5. District Jannale						
6. District Kurtawere) New districts by adjustment						
7. District Sablale) within the region.						
	37,000	74	9	-	-	-
Year 6						
4. Lower Juba Region				1	1	1
1. District Kismayo	2,000	4	1			
2. District Jamame	13,000	26	3			
5. Middle Juba Region				1	1	1
1. District Galib	8,000	16	2			
2. District Sako	4,000	8	1			
3. District Boale) New districts by adjustment						
4. District Dujuma) within the region.						
6. West Galbeed Region				1	1	1
1. District Hargeisa	5,000	10	1			
2. District Gabile	5,000	10	1			
3. District Borama	6,000	12	2			
	43,000	86	11	3	3	3
Year 6 1/2						
7. Hiran Region				1	1	1
1. District Belatwaine	3,000	6	1			
2. District Bule Burti	2,000	4	1			
3. District Jalalaksi	2,000	4	1			
8. Bakool Region				1	1	1
1. District Huddur	3,000	6	1			
2. District Teyeglow	2,000	4	1			
9. Gedo Region				1	1	1
1. District Bardera	5,000	10	2			
2. District Luk	1,000	2	1			
3. District Dolo	1,000	2	1			
10. Togdheer Region				1	1	1
1. District Burao	3,000	6	1			
2. District Odweine	4,000	8	1			
3. District Sheikh	1,000	2	1			
	27,000	54	12	2	2	2
Grand Total:	195,000	368	52	13	10	10

1/ Regional Crop Production Specialist
2/ Regional Plant Protection Specialist.

SOMALIA

AGRICULTURAL EXTENSION AND FARM MANAGEMENT TRAINING PROJECT

EXTENSION TRAINING CHART

Activity	Where held	Frequency	Duration	Participants	Trainers	Supervisor
I. Pre-service training						
1. Field Agents	ETCs	at entry into service	2 years (including 14 months on job)	FEAs (368)	ETCs	Principal ETC
2. Supervisory Staff (a) Faculty level	FMETC	at entry into service	2 years (including 11 months on job)	REOs (10) RCPOs (10) RFPOs (10) Principals ETC (2)	FMETC	Principal FMETC
(b) Secondary School level	FMETC	at entry into service	2 years (including 11 months on job)	DEOs (52) Instructors ETC (8) Farm Managers ETC (2)	FMETC	Principal FMETC
II. Periodic in-job training						
1. Fortnightly training for field staff	Region/ETC/ RRS	1 per two weeks	1 day	All FEAs/DEOs in the region in groups of 30-40	RCPO, RFPO assisted by RRS, ETC	REO
2. Monthly training for regional officers etc	FMETC	1 per month	2 days (1st and 2nd day of month)	All REOs, RCPOs, RFPOs and Technicians from state and other large farms	CPS, FPS assisted by CARS, FMETC, C.S.	Director, NES
3. Seasonal training - headquarters	FMETC	2 per year	2-3 days	All REOs, RCPOs, RFPOs and Technicians from state and other large farms	CPS, FPS assisted by CARS, FMETC, C.S.	Director, NES
4. Seasonal training - regions	Region/ETC/ RRS	2 per year	2-3 days	All FEAs/DEOs in the region	RCPO, RFPO assisted by RRS, ETC	REO
5. Orientation training	Region	at start of program in concerned area	3-4 days	All FEAs/DEOs in concerned area	REO assisted by headquarters staff and staff from on-going areas	REO
III. Special training						
1. Seasonal training for technical staff	FMETC/CARS	2 per year	1-2 weeks	RCPOs, RFPOs, Instructors ETC, Technicians from state and other large farms	FMETC/CARS assisted by CPS, FPS	Principal FMETC
2. Special courses for technical staff	FMETC/CARS	As per requirement	1 to several weeks as per requirement	RCPOs, RFPOs, Instructors ETC	FMETC/CARS assisted by CPS, FPS	Principal FMETC
3. Refresher training for field staff	ETCs	1 per two years	1 month	FEAs, DEOs	ETCs assisted by RRS and RCPOs, RFPOs	Principal ETC
IV. Overseas training						
1. MSc	Overseas	at start of program	1 1/2 to 2 years	Counterparts for Expatriates	Overseas	Project Manager
2. Study tour	Overseas	during program	3 - 6 months	Senior Officers in extension service	Overseas	Project Manager
3. Field Visits	Overseas	at start of program	3 - 6 weeks	Senior official MOA & Senior Officers	Overseas	Project Manager

REO: Regional Extension Officer
RFPO: Regional Plant Protection Officer
RRS: Regional Research Station
CPS: Crop Production Specialist
FPS: Plant Protection Specialist
CARS: Central Agricultural Research Station
C.S. Communication Specialist

ATTACHMENT 1

Suggested Syllabus for Farm Management

At present, the curriculum of both the Agricultural Faculty and the Agricultural Secondary School include an insignificant amount of farm economics and farm management. As a result, the training at the FMETC cannot draw upon previously acquired knowledge in these subject matters, but will have to lay its own foundation in order to give the trainees the capacity to deal successfully with special economic and managerial problems.

I. Basics in Farm Management (20 weeks, 2 sessions/week)

A. Definition of Economics:

- macro-economics: definition in the social environment of developing countries;
- micro-economics: farms as economic and production units.

B. Agriculture as a major sector of the Somali economy.

C. Objectives of farming:

meeting the national goals and needs

meeting the individual's goals and needs

meeting the farmers' economic goals and needs

D. Types of farms and means of farming:

land, labor, management, other production means

E. Capital and investments:

land

buildings, construction

machinery

animals

orchards

F. Decision making principles:

optimal intensity of factors of production

minimum cost of production

optimal use of scarce resources

G. Application of the production principles to real farm situations (examples):

land allocation

optimal fertilization

minimal cost solutions for mechanized production procedures

input substitution

H. Problems of risk and uncertainty:

risk situation and how to deal with it in decision making; farmers' behavior toward risk

uncertainty situations and how to deal with them in decision making

farmers' behaviour toward uncertainty

I. Fields of management:

management in the field of production

management in the economic and social fields

J. Farms as production units:

organizational structure

inputs-output system (flows of means and cash)

management needs and commanding lines

K. Farms as economic units:

the small private farms as socio-economic entities (integration of farm and family in production and consumption)

the group farms as partial collective farms

the large-scale farms: state farms, cooperative farms, crash program farms

the settlement development farms

the development projects as production units

L. Farm management as a comprehensive task (and its main fields and means). The four-step procedure:

1. Decision-Making: it requires information, processing data, evaluating alternatives and selection one of them, records and accounting being the major source of information, planning the main "instrument" for evaluating the alternatives;

2. Procuring the means for implementing the alternative chosen;

3. Controlling and monitoring the production processes;

4. Comparing the achieved results with the expected results and finding ways and means to improve the achievements.

II. Business Accounting in agriculture (20 weeks, 2 sessions/week)

A. Basic principles of business accounting and accounting systems:

Single entry accounting (for small farms) with detailed accounts on farm sales and costs

double entry accounting

B. Basic structure of accounting, accounting process and inventories, closing accounts:

journal ledger, accounts, balance sheet

accounting sales and purchases

stock taking and evaluation of inventories

profit and loss-account and statement

C. Cost Accounting:

theoretical basis (costing concepts, costs classification, costing methods and techniques, cost accounts)

cost data: materials, labor, direct expenses, overheads, enterprise costing, unit costing

D. Managerial Accounting;

records and statistics on inputs, outputs

business analysis, financial analysis

cost control and cost analysis

partial budgeting and farm budgeting

III. Farm Management (special course in 2nd semester)

A. Basic Subjects

1. management principles and concepts

2. organization principles;

functional systems and structures

authority and command (hierarchical or functional)

coordination and control

staffing and personnel selection (background, experiences)

directing (initiating, guiding, counselling, delegating)

leadership (style, qualities, factors)

motivation, participation, incentives, morale

3. management techniques;

management by objectives and management exception

office work (filing, documentation, ordering, reporting)

integration of accounting or keeping records and management information

B. Applied Subjects

1. planning production programs: rotations and cropping pattern, material planning

2. organizing and planning field operations: requirements, timing (machinery and labor budgets)

3. calculating unit costs, gross margins and cost of central farm services (office, store, workshop, etc.)

4. planning water allocation and irrigation programs (water management, requirements and optimal distribution)

5. planning crop waste and by-product utilization by animals (fodder budget, partial budgets on meat production, etc.)

6. planning production and evaluation of profitability of small and large-scale farms (farm budgets)

7. special management problems on small private farms, on group farms and cooperative farms and on large state farms

8. handling labor, mobilization and training, remuneration and payroll procedures

9. problems of purchases and sales (stock management, spare parts procurement, etc.)

10. project management

Suggested Syllabus for Crop Production

I. Basics in Agronomy

A. Soils: their treatement and improvement (land preparation, land amelioration, land cultivation, erosion control, applying organic matter).

B. Water: moisture conservation on dry land, irrigation on irrigated land, water charges, evapotranspiration, plant water requirements, salinity problems, drainage, etc.

C. Plant nutrition and fertilization, manuring.

D. Husbandry practices, seeds, seed rates and sowing technique, weeding, hoeing, plant protection, insect control, etc.

E. Harvesting and product post-harvesting treatment and storage

F. Cropping systems, role of fallow, rotation plans, agronomic constraints (labor and water requirements as limiting factors, seasonality).

II. Crop Husbandry

With all the crops, the emphasis should be on how to produce a good crop under the various soil and climatic conditions.

A. Classification of crops and their characteristics as regards productivity of land, water and labor.

B. Crop selection, cropping calendar

C. Crop specific husbandry practices:

Grain crops (rice, maize, sorghum, millet)

Oil Seed Crops (sesame, sunflower)

Leguminous Crops (groundnuts, beans, peas)

Fibre Crops (cotton)

Root crops (sweet potato, potato, cassava, yam)

Tropical fruits (bananas, citrus, mango, papaya)

Long-term crops (sugar cane, coconuts)

Vegetables (tomato, melons, pumpkins, carrots, onions, eggplant)

Spices (chili, ginger, garlic, pepper)

Fodder Crops (artificial pasture, fodder grasses, maize)

III. Managerial Aspects

A. Planning cultivation schedules to account for specific constraints

B. Planning water requirements and irrigation schedule for cropping systems

C. Planning labor requirements and production techniques

Suggested Syllabus for Farm Mechanization

Farm mechanization should be understood as a means for higher productivity and not as an end in itself. Trainees have, therefore, to be taught "how to make the best use" of the technical means at hand for the various operations during the cropping year to attain the goal of increased production. Students should be familiar with:

1) the characteristics of the technical means (machinery including sources of energy, implements, tools) that are likely to be available in Somalia.

2) the basis of selection of appropriate technology under the prevailing conditions, mainly with regard to productivity, land characteristics and suitability for particular crops.

I. Basics in Farm Mechanization

A. Mechanization Systems and stages of mechanization starting with hand tools, ox-drawn implements, partial tractorisation, fully mechanized techniques.

B. Materials and methods:

Engines and Tractors

Implements for soil preparation and mechanical cultivation

Implements for seeding, planting, plant protection

Implements for harvesting, transport and materials handling

Irrigation Equipment

II. Mechanization of Crop Specific Farm Operations

A. Cereals; rice, maize, sorghum, millet

B. Oil seed crops; sesame, sunflower, oil

C. Leguminous crops: groundnuts, beans, peas

D. Root crops: sweet potato, potato, cassava

E. Fibre crops: cotton

F. Tropical fruits; bananas, citrus, pineapple, papaya

G. Long-term crops: sugar cane, coconuts

H. Vegetables: tomato, onions

I. Fodder crops: grasses, maize

III. Managerial Problems

A. Organization and planning of machinery use

B. Organization and planning of workshop services, spare parts stock

C. Keeping records on work hours, fuel consumption, maintenance

D. Cost calculations for mechanized farming

Suggested Syllabus for Animal Production

I. Basics in Animal Production

A. Animal Husbandry in Somalia: in private small farm sector and large cooperative and state farm sectors, by species. Role of livestock in various production units and in the economy as a whole.

B. Organizational aspects of animal production: breeding, feeding, animal care, herd size, labor requirements, integration into crop farms through utilization of crop wastes and by-products.

C. Technical aspects of keeping animals: reproduction, nutrition, milking, fattening.

II. Animal Husbandry

These sessions should deal with the question of "how to keep animals efficiently" as regards the various conditions for optimal production.

A. Cattle (dairy, beef, draught)

B. Sheep (milk, wool, meat)

C. Goats (milk, meat)

D. Camels (milk, meat, work)

E. Horses, donkeys, mules (work)

F. Poultry (eggs, meat)

III. Managerial Problems

A. Optimal utilization of fodder, crop waste and by-products

B. Supplementing the feed rations by concentrates and/or forage production within the cropping system

C. Improving natural grazing grounds, rotation systems in grazing and manuring

D. Providing water and shelter for the animals, fencing, health facilities

E. Purchasing and selling: pricing, market outlets

Suggested Topics for Training in Agricultural Extension

I. Basic Course (20 weeks, 2 sessions/week)

A. Agricultural Extension - Philosophy and Objectives:

1. Extension, a continuous education process.
2. Development through promotion of self-help among farmers.
3. Increasing agricultural production for raising farmers' incomes and standards of living.

B. Extension Approach:

1. Social and economic considerations in extension development.
2. Communication at people's own level in their own language.
3. Spirit of sympathy and understanding.

C. Introduction to extension communication.

D. Introduction to extension methods.

E. Introduction to extension teaching material preparation.

F. Introduction to extension aids.

G. Extension Organization in Somalia.

H. Extension Methodology based on continuous training and constant contact with farmers.

I. Extension service and large farms:

1. Ultimate aim of good farm management - a good crop.

2. Need for right practices from sowing to harvest.
3. Need for precise step-by-step training in right practices.
4. Involvement of Assistant Farm Managers (or other agricultural technician) in monthly training sessions at extension headquarters.
5. Weekly practical training of field managers and foremen and effective action for implementation.
6. Feedback and solution of problems.
7. Direct involvement of farm managers in weekly training sessions.

II. Specialized Course (20 week, 6 sessions/week)

A. Extension program development

1. Involving people in program development.
2. Collection of data, analysis and preparation of program.
3. Preparation of plan of work.
4. Farm planning.

B. Extension Communication

1. Mass communication
2. Group comm-nication
3. Person to person communication

C. Extension Methods

1. Farm and home visits
2. Group discussions
3. Result demonstrations
4. Method demonstrations
5. Village meetings
6. Exhibitions
7. Field days
8. Campaigns
9. Mass media
10. Printed material - leaflets, posters

D. Preparation of extension teaching material - lesson planning.

E. Extension Aids

1. Blackboard
2. Charts and graphs
3. Posters
4. Flash cards
5. Flannel graphs
6. Motion pictures
7. Slides and film strips
8. Photographs
9. Models and specimens

F. Farmers Organizations

1. Promotion of joint undertakings
2. Protection of common interests
3. Development of local leadership
4. Formal and informal farmer organizations
5. Farmer discussion groups
6. Activity planning, joint activities, mutual cooperation.

G. Farmer Leadership Development

1. Progressive Farmers
2. Utilization of farm leaders
3. Development of farm leaders
4. Farmer training
5. Recognition

H. Rural Youth Programs

1. Organization of rural youth
2. Selection of projects

I. Rural Women's Programs

1. Role of women in farm work
2. Involvement of women in extension
3. Better homes

J. Extension Organization

1. National level
2. Regional level
3. District level
4. Field level

K. Extension Methodology

1. Extension aims to bridge the gap between research and farmers fields. This can be done quickly with sustained step-by-step guidance to farmers.

2. Problems facing present extension system - lack of effective contact with farmers, lack of coordination with research.

3. Extension Methodology

   a. Training - monthly training of regional officers followed by bi-weekly training of extension agents. Concentration on limited practices at a time. Practical training.

b. Contact with farmers - fixed schedule of Extension Agent visit to farmers at fixed time and day every week.

4. Basic requirements for success - single line of command, exclusive extension work only.

5. Role of contact farmers, concentration on contact farmers' fields.

6. Organization at national, regional, district and field levels.

7. Supervision - Fixed field visits by headquarters, regional and district officers. Director of National Extension Service should persona-ly guide the headquarters/regional training sessions.

8. Coordination with research. Technical Coordination Committee under Director General Ministry of Agriculture. Crop Production/Plant Protection Specialists at headquarters/ regions should spend one-third of their time for contact and discussions with researchers. Recommendations/lessons should be prepared in close consultation with research.

9. Input coordination - Representatives of ONAT and Banks, etc. should be invited to regional training sessions for input coordination.

10. Communications support - Audio visual materials etc. should be used in conjunction with training.

11. Impact of extension in projects in other countries.

12. Key requirements for success of program - high quality of effective practical training, regular punctual visits, farmer trust, concentration of efforts.

III. Applied Project Work

A. Village survey and development of village extension program.
B. Preparation of farm plans.
C. Planning of an extension campaign.
D. Assessment of effectiveness of different extension methods.
E. Good extension mix for Somali conditions.
F. Ingredients of a good demonstration.
G. Planning extension program with different media - practical work.

1. Charts and Graphs
2. Posters
3. Flash Cards
4. Flannel Graphs
5. Photographic Story
6. Slide Story
7. Models and specimens

Objective of Training:	Providing accountants to the state farm sector through an intensive bookkeeping course as pre-service training
Goal of Training:	Trainees should be able to establish and carry out proper accounting in the individual state farms under the supervision and the assistance of the Farm Management Advisory Service.
Background of Trainees:	Intermediate School with possibly some experience in accounting, and some knowledge of English.
Duration:	About 3 months or as circumstances require.
Structure of Training:	6 days a week training, daily 4 periods in the morning for presenting new subjects, 2 periods in the afternoon exercising accounting on the basis of selected concrete examples from existing state, cooperative and resettlement farms.

Suggested Syllabus

1. Legal aspects of accounting in Somalia: The unified accounting system and its relevance to agriculture.

2. Role of accounting for the Government and for the participating state farms.

3. Accounting as a basis of farm management.

4. Components of an accounting system in a farm:

   A. Inventories;
   B. Bookkeeping in journals and accounts;
   C. Closing accounts, profit and loss summary account, balance sheet;
   D. Special records.

5. The Chart of Accounts: definition, explanation and description:

   A. Fixed assets (accounting, evaluation, depreciation, liquidation);

   B. Financial assets;

   C. Stocks, cash and bank accounts, debts, accounts receivable, deferred charges, prepaid expenses;

   D. Internal accounts;

   E. Capital;

   F. Bank and loans;

   G. Deferred credit and prepaid income;

   H. Creditors and accounts payable;

   I. Result of the year accounts;

   J. Sub-balance sheet accounts;

6. The accounting records and procedures (accounting process)

   A. Entries documentation, voucher register;

   B. Booking and double entry system; the books for sales and purchases;

   C. Ledger accounts;

7. Final accounts: Profit and Loss summary account; the balance sheet;

8. Special registers and records;

   A. Crop production records and labor records;

   B. Animal production records;

   C. Store accounts;

   D. Payroll records;

   E. Branch accounting;

   F. Enterprise costing;

   G. Statistics on input and outcome performance.

This course is assumed to be a basic course. It would aim at introducing the unified accounting system. Additional in-service training by the Farm Management Advisory service and short-term courses would build up skills in special fields and strengthen weaknesses of the trainees.

ATTACHMENT 2

Suggested Terms of Reference for the Principal of the FMETC

Duties and Responsibilities

The Principal of the FMETC would be ultimately responsible to the Director of the Department of Production and Extension in the Ministry of Agriculture. During the investment period, however, the Principal would report directly to the Project Manager. He would have full responsibility for the establishment and the functioning of the FMETC under the direction of the Project Manager.

The Principal would assume primary responsibility for (a) overseeing the design and construction of the FMETC buildings; (b) determining the staff requirements, developing comprehensive training programs for farm management and extension training for both Faculty and Secondary School graduates; (c) drawing up a suitable training curriculum; (d) procuring teaching facilities including the workshop and the machinery and equipment for the 60 ha training farm; (e) the Principal would also administer the FMETC and establish links with Government agencies and other training institutions, particularly the neighboring Faculty of Agriculture, Agricultural Secondary School and Central Agricultural Research Station; (f) the Principal would participate in the actual teaching by assisting in the extension training.

Qualifications

The candidate would be a qualified Agricultural Training Specialist with at least an MSc Degree in Agricultural Education preferably with an option in agricultural extension. He would have broad field experience in these fields. In addition, it would be essential that the candidate have practical experience in managing training centers in developing countries and that he be able to create a favorable environment for team work. He should have a strong inclination for practical field training.

Suggested Terms of Reference for the two Lecturers in Crop Production, (irrigated and rainfed) and One Lecturer in Plant Protection

Duties and Responsibilities

The Lecturers in Agronomy/Plant Protection would, under the supervision of the Principal of the FMETC, be in charge of guiding the trainees both through classroom work and practical field work in their respective fields. They would preferably have experience with both irrigated and rainfed crops. Their duties would include the following:

A. Assist as a team in drawing up a comprehensive program for training of extension/farm management personnel in practical agriculture in respect to their particular specializations;

B. Assist in drawing up a suitable balanced curriculum to prepare trainees for effective field work;

C. Guide extension/farm management personnel through a well considered mix of classroom and practical field work;

D. Assist the specialists in the National Extension Service in periodic on-the-job training of regional technical officers; and

E. Establish close coordination with the Central Agricultural Research Station for ensuring relevance of the training program to the recommendations developed by research and the actual needs of the Somali agriculture.

Qualifications

The candidates would be qualified Agriculturalists with at least an MSc degree in Agronomy/Plant Protection and extensive teaching experience. It would be essential, in addition, that the candidates have a large amount of practical experience in low rainfall/irrigated crops in tropical areas. The Irrigated Agriculture Specialist should also have experience in large scale farming.

Suggested Terms of Reference for Lecturer in Agricultural Engineering

Duties and Responsibilities

It will be the responsibility of the Lecturer in Agricultural Engineering under the supervision of the Principal of the FMETC, to organize the training of farm management and extension personnel in practical agriculture with respect to an appropriate and efficient use of farm machinery and implements at all stages of technical development: hand tools, animal draught and tractorisation. He would guide the trainees both through classwork as well as practical exercises in workshop and in fields. The Lecturer would be experienced in the application of intermediate and advanced technology under conditions similar to those prevailing in Somalia.

The duties of the Lecturer in Farm Mechanization would include the following:

A. Assist in drawing up a comprehensive program for training of farm management/extension personnel in the use of farm tools, implements and machinery.

B. Assist in drawing up a suitable balanced curriculum to prepare trainees for effective field work.

C. Develop a program for a well considered mix of classroom and practical field work.

D. Assist the specialists in the National Extension Service in periodic on-the-job training of regional technical officers.

E. Assist the specialists of the Farm Management Advisory Service in periodic on-the-job training of assistant farm managers and field managers, and in advising them on farm mechanization related issues.

Qualifications

The candidate would be a qualified Agricultural Engineer with at least a MSc Degree and with extensive experience in teaching. In addition, it would be essential that the candidate have a large amount of practical experience in tropical agriculture, particularly in irrigated agriculture, on an intermediate and advanced level of technology.

Suggested Terms of Reference for a Master Mechanic

Duties and Responsibilities

It would be the responsibility of the Master Mechanic, under the supervision of the Principal of the FMETC, to organize the training of farm management and extension personnel in all aspects related to the maintenance of agricultural machinery and implements as well as in planning and managing workshop services. The Master Mechanic would be primarily responsible for:

A. Assisting in drawing up a comprehensive training program.

B. Establish a workshop and supervise its operation.

C. Train farm management/extension personnel.

D. Assist the Agricultural Engineer in periodic on-the-job training of assistant farm managers and field managers, particularly with respect to workshop management.

E. Advise managers of state farm on the procurement, operation and management of farm machinery and equipment and the operation of workshops.

F. Give initial pre-service training to mechanics of state farm.

Qualifications

The candidate would be a qualified Farm Machinery specialist with experience in training.

Suggested Terms of Reference for a Lecturer in Farm Management

Duties and Responsibilties

It would be the responsibility of the Lecturer in Farm Management, under the supervision of the Principal of the FMETC, to organize the training of farm management and extension personnel in managerial aspects of agricultural production both on small private farms and on large scale private and state farms, cooperative farms and settlements. He would guide the trainees both through class work and practical field work.

The duties of the Lecturer in Farm Management would include the following:

A. Assist in drawing up a comprehensive program for training of extension/farm management personnel in practical farm management;

B. Assist in drawing up a suitable balanced curriculum that would prepare trainees for effective field work;

C. Train farm management/extension personnel through a well considered mix of classroom and practical field work in the basics of farm management;

D. Train farm managers and field managers at an advanced level that would allow them to assume their managerial duties on large-scale state and cooperative farms;

E. Assist the technical specialists of the Farm Management Advisory Service and the National Extension Service in periodic on-the-job training of farm management and extension personnel;

F. Supervise newly trained farm managers and field managers during their internship;

G. Assist in the establishment of the Farm Management Advisory Service and in the performance of its functions of assisting newly trained managers.

Qualifications

The candidate would be a qualified Farm Management Specialist with at least a MSc Degree in Agricultural Economics and Farm Management. He should also have extensive experience in teaching. In addition, it would be essential that the candidate have worked in tropical or sub-tropical developing countries, preferably in managing farms and production cooperatives or in establishing and/or teaching at agricultural vocational training centers.

Annex 8

FMETC Analysis

General

The most critical need in developing a viable Agricultural Delivery System is an adequate supply of properly trained manpower. In order to provide sufficient numbers of middle level extension specialists, the FMETC will be established at Afgoi to train students specifically for farm management and extension positions. The FMETC will include living facilities for students, teaching facilities, livestock and livestock facilities and a 60 hectare training farm.

Students will primarily be graduates of the Agricultural Secondary School, the Faculty of Agriculture, and existing extension personnel who have had limited agricultural training.

In order to provide sufficient Field Extension Agents, the present Farmer Training Centers at Jannale and Bonka will be upgraded to Extension Training Centers for the training of FEAs.

FMETC

The FMETC will ultimately be graduating some 70 persons per year, 30 of which will be University graduates and 40 will be Agricultural Secondary School Graduates. It is estimated that of the 70 graduates, approximately 30 will go to the FMAS and 40 will go to the NES. The first half of the training course for FMAS and NES will be joint and in the second half the trainees will specialize.

A two-year curriculum will be offered with the teaching emphasis on "learning by doing." The basic instructional format will be a combination of 90 minute classrrom lecture-discussion sessions and 120 minute laboratory demonstration type experiences. All students will follow the same general course of study for the first year. Second year students will have the option to specialize either in farm management or extension methodology. Project work for those in the farm management option will emphasize farm planning, budgeting, record keeping and analysis and enterprise analysis. Project emphasis in the extension option will include extension methods, preparing teaching materials, conducting surveys, organizing and working with groups of people, crops and livestock.

The school year will be divided into two 20-week semesters to coincide with the Gu and Der seasons. The first semester will begin in March and the second in September with approximately one month vacation between each semester. This schedule will permit students to follow projects at the demonstration farm through a cycle from land preparation to crop development. Harvest may not be completed in all cases during the time allowed.

The typical school day for a student will include one 2-hour demonstration type class and two 90 minute lecture-discussion classes for a total of five hours in class. In addition, he will be expected to spend 3-4 hours per day in out-of-class and independent project work.

Based on observation and a partial understanding of the Somali life style, the following schedule is suggested:

7:00 - 9:00 a.m. Lecture-Discussion Class
9:30 - 11:00 a.m. Lecture-Discussion Class
11:10 - 12:40 p.m. Lecture-Discussion Class
12:45 - 1:30 p.m. Lunch
1:30 - 3:30 p.m. Leisure time
3:30 - As needed Independent Study or Project Work.

Suggested Timetable

Saturday	Sunday	Monday	Tuesday	Wednesday	Thursday
Session 1.					
Practical work of student teams on demonstration plots and students' production plots, including handwork, animal draught and tractor driven implements.					
Session 2.					
Agronomy	Agronomy	Agronomy	Farm Machinery Implements	Farm Machinery Implements	Farm Machinery Implements
Session 3.					
Plant Protection	Basics in farm management		Animal Husbandry	Basics in Extension Work	
Afternoon:					
Practical work	Workshop Machinery		Visiting Tour	Project Work	Project Work

Lecture classes should be limited to about 25 students per class. Demonstration classes should be limited to 12 students who could work in teams of three. Each team of three would be involved in a specific project that would provide practical work experience.

The curriculum will include training in:

Farm Management
Extension Principles and Methods
Crop Production
Animal Production
Farm Mechanics
Communications
Plant Protection

See Attachment 1 for additional details of the curriculum.

The faculty at the FMETC initially will include seven expatriate staff and two Somali staff.

Skill	Expatriate	Somali
Ag Training Specialist/Principal	1	
Agronomist - Drylands	1	
Agronomist - Irrigated	1	
Plant Protection		1
Animal Husbandry	1	1
Ag Engineering	1	
Farm Management	1	
Master Mechanic	1	

In addition to the full-time staff, the technical assistants at the NES will teach selected courses at the FMETC. These skills include:

Agricultural Extension Specialist
Plant Protection Specialist
Farm Systems Specialist
Communication Specialist

Conversely, the FMETC staff will serve as Extension subject matter specialists to assist in solving specific field problems. This staff interchange will strengthen linkages between the NES and FMETC and provide field experience for FMETC staff.

See attachment 2 for scopes of work for the FMETC staff and Annex 7 for scopes of work for the NES staff.

By the end of the 5-year project, it is anticipated that the expatriate staff members will be replaced with Somali faculty.

The normal teaching load for the FMETC staff will be six classroom sessions of 90 minutes each and six demonstration project sessions of 120 minutes each for a total of 21 instructional hours per week. The balance of the time will be spent in preparation, counseling students, demonstration research, assisting with in-service training for extension personnel and as extension specialists. Therefore, the faculty of FMETC should be recruited with the understanding that this assignment includes all of these duties.

Project Work

Will be mainly farm management (planning, budgeting, etc.) for farm management trainees and extension work (surveys in villages, developing extension materials, etc.) for the extension trainees.

The physical requirements of the FMETC are determined by the number of students and the number of parallel courses, the duration of the courses, and the type of training. The number of students is restricted by the maximum allowable size of classes and by the number of graduates from the Faculty of Agriculture and the Agricultural Secondary School who would be likely to join the FMETC. It appears that 30 Faculty graduates could join the FMETC each year starting in 1981. The number of graduates from the Agricultural Secondary Schools joining the FMETC would amount to 45 in the early years tapering to about 40 at a later stage as other demands on this type of graduate acquire more urgency. The maximum number of students to be provided with classrooms, practical training facilities, housing and boarding facilities would therefore be around 75. In addition, housing facilities for the senior and junior staff members and for the other permanent employees would have to be provided.

Besides its main role in providing preservice training for the high and middle level farm management and extension staff, the FMETC would provide short-term courses as pre-service or in-service training in special fields such as accounting, storekeeping, plant protection, irrigation and other special technical, managerial and extension skills. No additional facilities for these courses would be needed since such short-term courses could be organized without difficulty between the semesters for large groups while small groups could be trained simultaneously during the semesters. The most serious problem for short-term courses would be the availability of additional specialists to carry the training load. The management of the FMETC would have to decide on the frequency and timing of such courses on the basis of staff availability both within the FMETC and through cooperation with other training institutions.

As mentioned above, about 50 percent of the course work would be in the form of practical training. The facilities needed for these activities would be located in the 60 ha training farm in Afgoi. These would include:

1) A workshop and machinery hall for training in the field of farm machinery and farm implements, including facilities for maintenance and repair of the equipment.

2) Barns and sheds to shelter animals for training students in animal husbandry and the use of animal traction.

3) Student production fields and demonstration plots.

4) Machinery and implements.

These facilities would be under the supervision of the Farm Management Specialist of the FMETC, but for each section, subject matter specialists would assume responsibility for their day-to-day operations. The Master Mechanic would be responsible for the workshop, the Animal Production Specialist would supervise the barns and related facilities and the manager of the Training Farm would be reponsible for the students production fields and the demonstration plots.

The physical requirements for the Training Farm in terms of land, buildings and equipment are detailed in Annex 12. The major components include:

1) The Training Farm consists of 60 ha located within walking distance of the Agricultural Secondary School on the ex-Tomato Factory Farm. The land has been irrigated in the past, but the present condition of the irrigation system is such that extensive rehabilitation is necessary. Formerly the irrigation system provided water to the land almost adjacent to the pumping system, as well as to the land to be used for the training farm. Since the land nearest the pumping station is now being irrigated from another pump, two-hundred meters of new canal would be constructed so that only the training farm plus a neighboring 20 hectares could be supplied without constructing a new pumping station. In addition to the small amount of new canal construction, it would be necessary to rehabilitate some 5 km of the old supply canals as well as approximately 800m of laterals with the necessary small structures such as division boxes, turnouts and checks. The original structures have deteriorated to such an extent as to be useless. A good surface drainage system would be installed, which should make it unnecessary to construct a deep drainage system.

2) A fully equipped workshop with 3 sections (wood, metal, electricity) each with 10 training places, a machinery hall, a fuel station, an inspection pit and a lifting ramp for servicing and repairing;

3) Stores for seeds, fertilizers and chemicals, grains and feed stuffs, spare parts, tires, lubricants, etc.

4) A cow shed (10 cows), an ox barn (5 pairs) and sheds for other cattle, sheep and goats, including storing facilities for roughage (silage, hay) and facilities for processing manure.

5) Hand tools (25 pieces of each) including spades, shovels, heavy hoes, light hoes, hand weeders, knapsack sprayers, sickles, forks, etc.

6) Ox-drawn implements (5 sets) including ploughs, harrows, seeders, cultivators, carts for transport.

7) Tractors (three medium size tractors with plough sets, two garden tractors with implements, one small track dozer) and tractor implements for sowing, spraying, weeding, and for irrigation, (irrigation ploughs, ridger, plain).

8) Harvesting equipment.

9) Transportation means for staff members and students.

Ten hectares in the Training Farm would be allocated for use by the Faculty of Agriculture and the Agricultural Secondary School students. The remaining 50 ha would be organized as follows:

1) Seven hectares (1 ha for each group of 10 students) would serve for training in the use of various types of farm machinery. This area would be out of production although the plots used would be rotated.

2) Seven hectares would be reserved for demonstration plots where the FMETC staff in close cooperation with the staff of the Central Research Station would establish crop trials to demonstrate the effect of various agronomic practices. These plots would be maintained by student teams according to a fixed schedule. In order to have the optimal impact on training, these plots would be made accessible to students by locating them as close as possible to the classrooms to allow for some of the sessions to be held right on the demonstration fields.

3) The remaining 36 ha would be utilized as students production plots. The purpose would be to give students a chance to make production related decisions, to evaluate the results of their actions, and to develop the ability to keep record of inputs and outputs to serve as a basis for future decision making. Inputs for these plots would be financed by the project on a credit basis and students would be asked to cover their direct production costs, (seed, fertilizers, chemicals, tractor hire, water charge), with any excess revenues left to them to share among themselves. In case of loss, however, it would be absorbed by the FMETC. Students would also be encouraged, to the extent possible, to joint efforts in buying their inputs and in marketing their output. Credit would be reimbursed after the output is sold.

Since the training program is on one hand oriented toward the Extension Service for small farmers both in rainfed and irrigated areas and, on the other hand, toward the management of large scale farms mainly in irrigated areas, students would be given a chance at practicing both rainfed and irrigated agriculture with possible specialization in rainfed crop production for future extension workers and in irrigated crop production for future farm managers. The production plots would be assigned to teams of 5 students thus forming 6 teams for group A (Faculty graduates) and 8 teams for group B (Agricultural Secondary School graduates), in all 14 teams. Ten teams would be provided with 2 ha irrigated land each, whereas the other 4 teams would cultivate 4 ha of rainfed land each. The plots, being 200 m long and 100 m or 200 m wide would allow practice with all types of machinery and production techniques used on small farm fields as well as on large farms fields and to bring the practical field work as close as possible to real conditions on real farms. With the assistance of the teaching staff, student teams would be capable of organizing their work to take care of their plots within the outlined time schedule. As a group, each team disposes of 10 ha of field work per day or 60 hours per week, in total 1,200 hours per season. With a well-designed working program no difficulties would be expected. In order to improve the working efficiency, student teams would try to the extent possible to assemble each crop on adjoining sections of land to allow for proper land preparation and to save on irrigation works and water. This would also facilitate supervision of the work of student teams by their teachers and would give the students themselves a chance to compare the results of their work, hence learning from each other's good and bad decisions and practices. The cropping system to be applied on the production plots would be based on the few main crops on which the training for rainfed and/or for irrigated agriculture would concentrate. In addition, the best varieties available would be used, leaving variety tests and crop trials with different production practices to the demonstration plots which would be established for that particular purpose. Both mechanical traction and animal traction would be used for both rainfed and irrigated plots. To approach still more real farm situations in rainfed agriculture, student teams engaged in dry land farming, therefore less taken by field work than the other teams, would be made responsible for caring for the animals on the Training Farm which would introduce them to an integrated farming system.

By the end of the 5-year project, it is anticipated that the expatriate staff members will be replaced with Somali faculty.

The normal teaching load for the FMETC staff will be six classroom sessions of 90 minutes each and six demonstration project sessions of 120 minutes each for a total of 21 instructional hours per week. The balance of the time will be spent in preparation, counseling students, demonstration research, assisting with in-service training for extension personnel and as Extension Specialists. Therefore, the faculty of FMETC should be recruited with the understanding that this assignment includes all of these duties.

ETCs

The ETCs will serve as training centers for extension agents as outlined in Annex 7. They will be staffed by FMETC graduates and operated by the NES. They are based on a short course approach given timely information to FEAs on a continual basis.

ANNEX 9

AGRONOMIC ANALYSIS

AGRICULTURE DELIVERY SYSTEMS

Introduction

The FMETC should not restrict itself to small crop farm agricultural problems, but since this class of farms in the rainfed areas of the Country dominate hectarage, numbers of farmers and the potential for expansion, the sector should receive priority emphasis. Crops, of course, will always be an important component of Somali agriculture. In conjunction with livestock enterprises, small rainfed farms will make the bulk of complete and well rounded units.

In this section a review of important crops, research done on them, present cultural practices used, possible cultural practices available, unresolved research problems, etc., will be discussed. All of these considerations will be included at appropriate places in the FMETC program. Graduates from the FMETC and other training programs will be better prepared to cope with these problems and contribute to the sector's development and the well being of farm families.

A Review of Somali Crops

This review includes the principal crops grown under rainfed conditions at the Bonka Training and Research Center and in the Bay region. The Center has been the only station to deal solely with rainfed research and demonstrations during the past ten years.

Reports from the Wyoming experience at Bonka have reported the majority of the information concerning rainfed agriculture. Insect

pests listed in this section were prepared in 1977 by the MUCIA entomologist stationed at the Afgoi Research Center.

Detailed and descriptive reports dealing with rainfed research are meager. Rainfed experiments initiated at Afgoi in 1978 failed, and 1977 research results were largely inconclusive.

At Bonka, sorghum research was stressed in light of the importance of the crop in the region. Little is known about other crops. Only a few studies dealt with maize, sesame, groundnuts or other crops although a considerable amount of sorghum, groundnuts, field peas, sunflower and safflower seeds were produced and made available to the MOA for eventual distribution to farmers.

Grain sorghum is a popular, adapted crop in the Bay Region as evidenced by its widespread cultivation and the presence of mixed local and introduced types grown on an estimated 85 percent of the land. Maize is planted throughout the Region but yields are unreliable and predominantly low due to the limited and erratic rainfall pattern. Millet is a dependable crop in the area but farmers give the crop very little consideration.

Production of edible oil seeds is confined to sesame and groundnuts. Sesame acreage is estimated to be around 10 percent of the cultivated land, while groundnuts probably occupy less than 5 percent. Both crops are generally adapted in the Region.

Cowpeas are cultivated to a limited extent as a single crop, as well as intercropped with sorghum or corn. Mungbeans are also reported to be produced under rainfed conditions.

The past experience of the University of Wyoming demonstrates the opportunity sorghum offers to increase grain production in the immediate future.

Sorghum (Sorghum bicolor)

A mixture of sorghum types is produced on at least 95 percent of the farms in the Bay Region. The crop is the most important cereal and is planted in both the "Gu" and "Der" seasons. Average yield is around 350 Kg. per ha. and is produced without improved technical or market inputs by farmers utilizing hand labor in all farming operations.

The importance and value of selected varieties and improved rain-fed farming techniques for increasing production were demonstrated by the University of Wyoming at Bonka from 1966 through 1969. Research and demonstrations undertaken included variety testing and selection of introduced and local types of sorghum, addition of animal manure, chemical fertilizers, green manure, alternate fallow effects, insecticide use, and the introduction of oxen drawn implements for land preparation and cultivation. Mechanized farming was also practiced using tractors, threshers and various types of seeding and cultivating equipment.

Variety Testing and Selection

During a two year period in which selections were made in local sorghum types, a local type used as the check produced 4.6 qq per ha. while the highest yielding selection produced 8.9 qq per ha. In the following year, the check yielded 10.6 qq per ha. and the best selection 14.8 qq per ha. The experiment indicated increased yields were provided

by selection for early maturity, shorter stalk length and higher yields.

In another experiment at Bonka in which varied varieties and a local check variety were yield tested for a period of six cropping seasons, overall average yields for the highest yielding variety was 11.3 qq per ha. compared to 7.9 qq per ha. for the local variety.

Value of Animal Manure

This demonstration consisted of an application of about 12,500 kg of animal manure per ha. applied before planting and mixed in the soil. A check plot of equal size was planted and treated equally except no manure was applied. The treated plot yielded about 30 qq per ha. versus 10.2 qq per ha. for the untreated plot. These figures represent an average yield over a period of six crop seasons.

Chemical Fertilizers

An application of 225 kg per ha. of 17-17-17 fertilizer was applied by drilling before planting sorghum. All plots were treated equally except for the check plot which received no fertilizer. The fertilized plot yielded 18 qq per ha. while the unfertilized plot yielded 12 qq per ha. These were average yields obtained for six crop seasons.

Green Manure

Cowpeas were planted as a green manure crop during the "Gu" season. Vines were plowed under after the crop obtained maximum growth and the field was planted to sorghum during the "Dir" season. Over a period of six crop seasons, sorghum yields were increased by an average

of 33 percent over the check plot yields.

Alternate Fallow

This demonstration was established to determine the effect of alternate fallow on sorghum yields grown on land after being fallowed for one crop season. Results indicated alternate fallowing after sorghum had little effect on yields.

Fallowing farmlands on alternate years or seasons is widely practiced in the temperate zones regions with limited rainfall. Long term experiments in the U.S. have shown that not more than 30 percent of the rainfall occurring during the year of fallowing can be stored in the soil for the succeeding crop. Often as little as 10 percent was conserved. Evaporation losses, soil moisture utilization by weeds and runoff losses from bare soil are largely responsible for the limited soil moisture storage. Stubble mulching instead of bare fallow has proven to be a major improvement in storing moisture. However, there may be situations where the total crop production on a farm may be increased by omitting the fallow and producing a crop every year by choosing a suitable crop, correcting soil fertility deficiencies with appropriate fertilizers, by adequate weed control in the crops, and by modification of all cultural practices to capitalize on moisture conservation and use.

Insecticides

The following insecticide research has been reviewed:

1. The spotted stalk borer (*Chilo partellas* Swin.) has been

identified as a pest causing recurring and serious losses in sorghum in rainfed farming regions. The Wyoming group demonstrated control of the borer with one application of DDT when sorghum plants were 12 to 15 cm. in height. The treated plot averaged an increase of 40 percent in yields greater than the untreated plot.

More recent research was reported by the MUCIA entomologist in 1977. The pesticide "Furadan 10 G" (granular form) was applied with corn seed during planting on irrigated land. Good control of the borer through the entire growing season resulted when applying 3 kg. active ingredieny per ha. Furadan is effective through systemic action in the plant. This chemical should also give good results in controlling stalk borer infestation in sorghum.

The Sorghum Midge (Contarinia sorghicola Coq.) has been identified as an important sorghum pest which attacks the plant and prevents seed development. Other than the identification of the pest, little is known about it in Somalia.

The Sorghum Shoot Fly (Atherigoria varia socatta Rond.) often attacks sorghum in the early stages of crop growth. Control has been shown to be satisfactory with Furadan granules placed with the seed at time of planting.

The preceding insects listed are believed to be the most important pests capable of causing severe yield reduction in sorghum. Practically all insect identification and pesticide evaluation trials were conducted on the research station at Afgoi. Very little insect pest research has been conducted in rainfed areas.

In addition to the insects listed previously, the following insects have been identified as sorghum pests in Somalia;

1. American bollworm, Heliothis armigera(Hub)
2. Armyworm, Mythimna loreyi(Dup.)
3. Blue bugs, Calidea spp.
4. Bollworm, Pyroderces hemizopha(Meyr.)
5. Chafer grubs, Schizonycha, spp.
6. Dried fruit beetle, Carpophilus dimidiatus F.
7. Flea beetles, Epitrix spp.
8. Maize aphid, Rhopalosiphum maidis(Fitch)
9. Spider mite, Oligonychus simus(Pritch and Bader.)

Maize (Zea mays)

Maize is probably the most sensitive to drought of the warm season cereals. Sorghum and millet tolerate dry periods during the growing season to a much greater degree than maize and are generally more productive where rainfall is limited and erratic during the growing season.

Maize yield trials and demonstration plots were grown at the Bonka center from 1966 through 1969. At the end of the three year period, the conclusion was reached that when equally treated plots of sorghum and maize were planted under comparable conditions, maize would produce only about 50 percent as much grain as sorghum. The principal site for maize research is the Afgoi station where practically all experiments and production are under irrigation.

Insect Pests: Insects found to be pests in maize at Afgoi are

are listed below:

1. Armyworm, Mythimna loreyi (Dup.)
2. Angoumois grain moth Sitotroga cerealella (Ol.)
3. Chafer grubs, Schizonycha spp.
4. Dried fruit beetle, Carpophilus dimidiatus (F.)
5. False codling moth, Crytophlebia leucotreta (Meyr)
6. Maize earworm, Heliothis armigera (Hub.)
7. Maize aphid, Rhopalosiphum maidis (Fitch)
8. Maize leafhopper, Cicadulina mubila (Navde.)
9. Rice weevil, Sitophilus oryzae (L.)
10. Stem borer, Sesamia cretica (Led.)
11. Spotted Stalk borer, Chilo partellus(Swim.)
12. Snout beetle, Tanymecus sparsus (Fhs.)
13. Termites, Macrotermes sp.
14. Wireworms, Elateridas

Groundnuts (Arachis hypogaea)

Groundnuts are believed to be grown more extensively than any legume in the rainfed region. In many areas groundnut acreage is increasing. The Wyoming group planted groundnuts at the Bonka Center to demonstrate the value of a green manure crop in a crop rotation scheme and as a food crop. The Spanish type is grown by most farmers in the area and was one of the most satisfactory types under test at the Center. A new groundnut introduction called "Local Large"matured three to five days earlier than the Spanish type and averaged four kernels per pod. In demonstrations conducted at the center, the average yield of the Local Large was 930 kg. per ha. compared to 623 kg. per ha. for the Spanish

type. Irrigated groundnut research has been conducted at the Afgoi Research Station.

Groundnut Diseases: *Cercospera* leaf spot and a type of "rust" are the only diseases noted in published reports.

Non-Parasitic Disorders: Two disorders mentioned in research reports are nutrient imbalances related to phosphorus fixation in soils around Bonka and the occurrence of a general plant chlorosis occurring throughout the growing season.

Insect Pests: Groundnut pests identified at the Afgoi Research Center include:

1. American bollworm, *Heliothis armigera* (Hub.)
2. Chafer grubs, *Schizonycha* spp.
3. Cotton leafhoppers, *Empoasca* spp.
4. Groundnut aphid, *Aphis craccivora* (Koch.)
5. Systates weevils, *Systates* spp.

Termites and thrips were also noted.

Sesame (*Sesamum indicum*)

In the review of rainfed crop research and demonstration reports, no information was reported dealing with sesame production or research. Apparently many different types of sesame are indigenous to Somalia, however, the white, cream or buff colored seeds are preferred. All of the types grown have the "shattering" or dehiscent characteristic. Maturity varies from 70 to 100 days. There appears to be interest in obtaining "non-shattering" types. A commonly reported average sesame yield is 378 kg. per ha. This probably includes irrigated production

which showed a higher yield than was obtained in the rainfed regions.

Sesame is reported to be grown mainly in the "Dir" season as insect pests are fewer than in the "Gu" season.

Pests: Insect pests identified on sesame trials at the Afgoi Research Center included:

1. Sesame webworm, *Antigastra catalaunalis* (Dup.)
2. Epilachna beetle, *Epilachna chrysomelina* (F.)
3. Various mites and some borer species were also reported.

Oxen Power Experience

One of the Wyoming functions at Bonka was the training of oxen to be used in farming operations. Fifty two head were eventually trained at the Center.

Oxen are currently in use at the Center for pulling plows and cultivators. The implements in use are single moldboard plows and a 4-row cultivator using locally constructed frames and standards mounted with various types of sweeps. Yokes constructed of wood and animal control lines are made at the Center.

Camels have also been trained and used to pull plows and cultivators. Only one camel is used for this purpose instead of the two oxen usually used. However, two men work with a camel while only one is needed with oxen.

Principles and Practices for Crop Production

Research conducted and farming techniques used in other dryland farming regions of the world have resulted in an accumulation of many

principles and practices which may be directly applied to areas where research has not been extensively conducted. In addition, to these applications, the currently applied local technology often may be improved or modified to increase production. Practices described in this report apply to many crops grown under rainfed as well as most irrigated conditions in the Bay Region of Somalia.

Total rainfall and its distribution is the principal limiting factor in crop production in the Region. Farming practices should emphasize two objectives:

1. To conserve rainfall and

2. To apply practices and technology which will make more effective use of water stored in the soil.

It should be noted that substantial yield increases of any crop require the simultaneous application of all or much of the technology to be used in rainfed or irrigated agriculture. Each recommended practice in a farming system should make a satisfactory economic contribution or the practice is not likely to survive. Increases in productivity need to be substantial to provide sufficient incentive to be adopted by farmers. The individual farmer must see immediate benefits, and, also, become convinced that continued progress is feasible.

Timeliness of Farming Operations

In order to successfully apply principles and practices needed for increased crop yields, farm managers assume the crucial role in determining the effectiveness of any improved input in the farming

system. And, timeliness of operations will be a key to the success of any system. Appropriate technological information cannot be fully beneficial to farmers until some plan can be presented in which the proper sequence of cultural operations can be understood and demonstrated to be effective.

Adapted Crop Varieties

This principle applied to improved agricultural technology cannot be over emphasized. Adapted crops form the most important base for developing and applying the required technology necessary to give substantial yield increases. Crops presently grown in the Bay Region are all adapted to some degree. However, decisions remain to be made with regard to the selection of the most highly adapted types or varieties within a specific crop. At the present time there are not seeds of highly adapted crops available for use by small farmers in the rainfed regions. In spite of this, farmers can improve yields to some extent by employing a relatively simple procedure for selection and care of his own seed.

Sorghum Seed Selection: Most farmers presently rely on their own production for a source of seed. The common seed threshing method entails beating sorghum heads with a wooden object in a receptical which serves to catch the threshed grain. This threshing process causes considerable grain damage in the form of cracked seed and broken seed. Farmers who use this seed will be planting a high percentage of low viability seed. When planted, emergence will be weak and scattered resulting in a low plant population which is evident by the

number of non-productive areas in a field.

Sorghum seed tends to show a discrepancy between field and laboratory germination percentages. A range of from 30 to 50 percent germination can occur even when seed of high viability is used. A marked deficiency in field emergence may be expected when the laboratory germination percentage is lower than 85 percent.

For farmers who select and use their own seed, a better method for obtaining seed is to remove selected heads from the field before harvesting and threshing. In this way, farmers can separate heads to be used for seed from the remainder of the crop. At this time, heads can be selected for desired seed color, large seeds (for greater vigor), heads which show little evidence of diseases such as smut, and heads free of insect damage. Selected heads should be properly handled and dried before threshing. This means placing them in a single layer in the sun and turning the heads periodically so drying is complete throughout each head. Seed should have a moisture content of about 12 percent. If insects infest heads in the field before harvest and an insecticide is available, heads should be dusted or sprayed to prevent continuing damage. After seed is dried, it should be carefully threshed by hand separation or by any method which keeps seed damage to a minimum level. An ideal method is to use a properly adjusted mechanical thresher. Seed should be placed in a clean container or bag in a shaded and protected area free from animals, birds and rodents. If seed is to be stored for any length of time, an insecticide should be applied to the seed container to prevent an insect infestation. Seed should be in-

spected on a regular basis to determine the presence of insects. If seed is stored for more than one season, a germination test should be used to check its viability before planting.

Time of Planting

Time or date of planting studies conducted throughout the world have demonstrated that early planted crops generally give higher yields than delayed plantings. This has been shown to be true for practically any crop. While time of planting for rainfed crops is actually determined by the rainfall pattern, planting before the anticipated commencement of the rainy season is recommended. This may mean planting seed in dry soil one week or more before the onset of rain. Dry seed planted in dry soil will usually store for the period of time mentioned. This practice may not be advisable under circumstances where bird and rodent depredations occur on newly planted land. Insecticide treated seed generally will prevent insect damage caused by soil inhabiting insects.

Early planting will have the following advantages:

1. It will enable the crop to take effective advantage of the total amount of rainfall occurring during the season.

2. If early maturing varieties or types are available for planting, the crop will have even a greater opportunity to reach maturity by fully utilizing the available soil moisture.

3. Early planted crops may take advantage of any higher natural soil fertility present at the beginning of the rainy season.

4. Early planted crops may escape or have less damage from insect

pests or diseases which tend to increase as the rainy season progresses.

5. Any soil moisture remaining after the crop is harvested will facilitate land preparation in anticipation of double cropping the land.

6. Early planted crops mature earlier thereby facilitating early harvesting in areas where bird populations increase as the season progresses.

7. Early planting may be desirable to avoid time conflicts with other crops during the harvest period.

8. An early planted crop also lends itself to the possibility of reseeding the land if emergence is poor after the first heavy rains have occurred. Seed should germinate and emerge within at least six days after a good rain. If emergence is poor, then reseeding can take place immediately.

Planting Depth

The recommended depth of planting for sorghum is from 2.5 to 5.0 cm. Percentage and rapidity of germination and emergence are often reduced by planting deeper than 6 to 7 cm. Shallow planting may also result in poor emergence, because the soil may dry too rapidly near the surface permitting seed to be exposed or in contact with dry soil. If soil crusting is a problem, seed should be planted about 2.5 to 3.0 cm. in depth.

Seeding Rates

An accurate seeding rate recommendation is one of the most difficult to make where low quality seed or questionable seed is used. Generally speaking, the best recommendation is to use large amounts of seed. This

may be double or triple the rate farmers would usually plant. The normal tendency is to plant the smallest amount of seed possible to obtain a crop even though there may be uncertainty as to seed quality. Determination of more precise seeding rates should consider at least three factors :

1. Germination percentage (seed viability)
2. Seed size
3. Seedbed condition

The following practices are recommended:

1. Plant seed having 85 percent or more germination.

2. Plant the largest seed available. Greater vigor may be closely correlated to seed size. High vigor seeds tend to tolerate deeper planting and will better emerge through crusted soil.

3. A firm, fine seedbed without the presence of large clods is desirable. Seed should be placed in a firm bed which will facilitate more uniform and close soil-seed contact.

4. Number of sorghum seeds per kg. may vary from 3500 to 8500 per kg. depending on the type or variety and individual seed weight. An estimated planting rate for the Bay Region using present quality of seed, should range from 4 to 6 kg. per ha. This rate should produce a stand of more than 12,000 plants per ha. Seed containing large numbers of cracked of broken seed should be planted at a higher rate. If the resulting stand is too dense with respect to the available soil moisture and nutrient supply, yields will be greatly reduced. Thinning the stand would be recommended in this case,

Seeding rates used in the U.S. are based primarily on the prevailing rainfall patterns for each production area. In semi-arid areas a rate of 2 to 4 lbs. per acre is commonly used. Higher rates are planted in areas of increasing rainfall. Heavily fertilized, irrigated land may be planted at a rate of 10 to 14 lbs. per acre to produce as many as 100,000 or more plants per acre.

Seeding rate for the rainfed region in Somalia can be determined more accurately when adaptive research studies are carried out to compare improved versus local practices with the crop.

Seed Spacing

Seed spacing in the field is related to the seeding rate. Other factors to consider are the tillering characteristics and the inherent height of various varieties. Sorghums which tiller very little may be planted at higher rates with closer seed spacing than varieties which tiller heavily. Tillering is also related to the soil moisture and nutrient availability. Tillering is usually greater on fertile soils. Short types of sorghum can be spaced closer together while intermediate and tall types require wider spacings.

If row seeding is used, a recommended spacing between rows is about 1 mt. Ultimate spacing within the row will depend upon the emergence density of plants. Seed may be planted about 1 to 2 cm. apart. If emergence is satisfactory, plants can be thinned when they reach a height of 10 cm. or so to leave a space of 30 cm. between plants. Tall types may be spaced around 40 to 50 cm. in the row. The use of a small seeder, such as the Planter Junior type, is highly

recommended for row planting.

In the Bay Region seed is planted by hand, broadcasting after the rainy season has begun. Several seeds are placed in shallow depressions formed by a hoe. Soil is pushedover the seed and compacted by the planter's feet. Most farmers will hoe the small depressions throughout the entire field before returning to place seed. This allows the moist, exposed soil to dry. An improved practice would be to place seed immediately after hoeing, covering seed to the proper depth and pressing the soil firmly several times to insure good soil-seed contact. Depressions formed in the bed should be deep enough to accumulate any rainfall. This practice will hasten the germination and emergence of seedlings.

Plant spacing used by farmers depends on custom, type of hoe used, and ease of planting suited to individual farmers. Each group of plants emerging may be referred to as a hill. With this method of planting, plants should be thinned to permit a spacing of 30 to 40 cm. between plants in each direction. Taller plant types can be thinned to 50 to 60 cm. Distances suggested are guides to seed spacing. Adaptive research should be initiated to determine optimum spacing for recommended cultural practices.

Seedbed Preparation and Moisture Conservation

Seedbed preparation or tilling the soil is normally not practiced on small farms in the Bay Region. However, "bunding" or forming small ridges of soil by hand around a field or within a field to form a series of adjacent rectangular basins is practiced on some farms to prevent rapid rainfall runoff. This is a good practice to allow for increased

water penetration and storage in the soil.

Use of animal power to pull tillage implements would greatly increase the efficiency of seedbed preparation, permit improved practices such as row planting, and other benefits listed below:

1. Permit farming more hectares.

2. Provide transport to haul manure to fields for spreading before plowing.

3. Permit shallow plowing or harrowing to remove weeds and turn under unharvested crop residue.

4. Permit use of a spike-tooth harrow or a wood drag or float to form a firm, friable seedbed.

5. Permit the use of a plow to form bunds or ridges to prevent rapid water runoff.

6. Permit the use of sweeps or cultivators to form shallow or deep furrows in which seed may be placed for row planting. Row planting is highly recommended for more uniform crop stands and to facilitate weed and pest control. A furrow could also collect rainfall.

7. Permit the adaptation of a small single row planter.

8. Permit use of row cultivators to remove weeds.

9. Provide transport to speed removal of crops and reside from fields.

Weed Control

Weeds should be removed as soon as they emerge to prevent the following deleterious effects:

1. Weeds remove moisture and nutrients needed by crops.

2. Unlimited weed growth competes for light needed by crops.

3. Weeds may also be hosts for insect pests and provide reservoirs for certain fungi, bacteria, virus diseases and nematodes harmful to crops.

4. Weeds allowed to mature and produce a seed crop will reinfest the land. Uncontrolled perennial weeds can eventually render the land useless, as many spread by vegetative growth and are extremely difficult to control.

5. Weeds allowed to reach a stage of growth where deep hoeing or cultivating is required to remove them will damage crop roots.

6. Uncontrolled weed growth impedes crop inspection, insect control and harvesting.

Recommendations

1. Hoeing weeds is an obvious recommendation, however it is a laborious and time consuming activity. If hoeing is used, weeds should be removed as soon as emergence takes place. This will reduce moisture loss from the soil and require less effort.

2. Row planting is highly recommended. Rows permit the use of animal pulled cultivators to remove weed growth as it emerges.

3. The use of a wheel hoe is recommended. This hoe is pushed by the operator and can be used successfully to remove weed seedlings. The wheel hoe could be modified for animal pulling.

4. Herbicides can be used in a later stage of advancing technology in farming. They would be useful during rainy periods when fields are too wet to cultivate.

Fertilization

The growth of all crops is strongly responsive to soil fertility. All land which has been cropped for any period of time will decline in fertility unless nutrients can be restored to the soil in some manner. Crop development limited by any nutrient deficiency will result in low efficiency in the use of available soil moisture. Drought tolerance in any crop is determined to some extent by nutrient levels. Crops deficient in nutrients will not withstand droughts as well as crops with higher levels of nutrients available.

Animal Manure: Benefits from applying animal manure have been demonstrated, and its use is recommended. However, there is some question as to the availability of quantities of manure required in the rainfed farming regions of Somalia. A source may be in concentrated poultry and feedlot dairy operations.

Green Manure: Green manure means a crop grown for the purpose of maintaining or increasing soil fertility by turning it under at the desired stage of growth. The crop may be allowed to grow to its maximum vegetative growth and then plowed under to add green organic matter and nutrients to the soil.

Legumes are preferred crops for green manure, although practically any crop may be used. Legumes have roots modulated with nitrogen fixing bacteria which provide nitrogen for the plant. When used as green manure, some of the nitrogen is available to the next crop grown. The crop should be turned under before maturity is reached. If only small tillage equipment is available, this is advisable. Mature crops are

more difficult to handle due to larger masses of dry matter and require use of larger equipment to turn under a crop in one operation.

While green manuring is recommended, small farms are generally not in a position to growgreen manure crops because no direct food or sales product is provided by the crop. Where groundnuts or other legume seeds are grown for food, the crop could be harvested, and if tillage equipment is available, the residue could be turned under to add organic matter and nutrients to the soil.

Chemical Fertilizers: Application of chemical fertilizers is the most efficient way to maintain soil fertility, as well as the most expensive source of nutrients. Farmers still using unsophisticated technology are rarely able to afford the use of chemical fertilizers.

Use of animal manures and green manure crops is recommended in Somalia. Elements usually applied in chemical fertilizers to increase soil fertility are nitrogen, phosphorus and potassium. There may be instances where trace or minor nutrient element deficiencies occur. These deficiencies may be corrected with applications of chemicals composed of the required elements. In any situation, the maximum use of animal and green manures will help to alleviate mineral deficiencies and provide organic matter to the soil.

Crop Rotation

Use of crop rotations can be highly beneficial in helping to achieve sustained economic crop yields. Rotations are recommended for the following reasons:

1. Green manuring with legume crops in rotation with grains add organic

organic matter, nitrogen and other nutrient elements to soils.

2. Reduced insect and disease inoculum potential is achieved by the use of specific crop rotations with forages in them to prevent a carry over of specific diseases, insects and certain root infecting nematodes. Each crop type may have certain specific problems.

3. Use of forage crops between food crop sequences will reduce pest populations and potential diseases peculiar to cultivated crops. Forages would also provide a practical means of feeding small farm herds of animals after crop residue are exhausted as a feed source. Perennial forage plants are less susceptible to droughts that severely reduce yields of annual crops. Since forages are not grown for a seed crop, any vegetative growth may be utilized.

Most perennial forages are more dependable in production than annual crops grown under limited rainfall. A disadvantage of perennials for small farm use is the greater energy and time requirements of perennials for their removal. Dense, extensive root systems make plowing and seedbed preparation very difficult without substantial tillage equipment.

Control of Insects and Diseases

Harmful insect infestation is a serious problem confronting crop production and storage. Insect pests are present for every type of crop grown in the Bay Region but little is known about most insects or their control. Insects have been known to completely devastate crops in both irrigated and rainfed areas. Level of infestation may vary from season to season. There is a belief that insect damage to crops is often

less severe in rainfed areas. Regardless of the geographic location and farming system, certain principles apply to insect control, such as:

1. The first principle is to plant types and varieties of crops known to have resistance or tolerance to important insects found in the area. It is likely that there are few, if any, varieties or types known in the region which have resistance. If one is known, there is very little seed presently available for distribution to farmers.

2. The use of crop rotations is probably the most useful practice available to farmers at this time. Rotations are helpful in reducing insect numbers and in reducing the amount of acreage of any crop-specific harmful insects.

3. Widespread use of insecticides in fields is not recommended for farmers in their present stage of technological development. The reasons are:

a. All insecticides should be considered dangerous. Many are highly toxic to many forms of life. Insecticides should be used only by persons with the appropriate level of knowledge and understanding of uses and dangers involved.

b. Insecticides are very expensive.

c. Indiscriminent use may be more harmful than beneficial by reducing or destroying populations of predators and parasites that attack harmful insects.

An exception to these recommendations may be in seed treatment with insecticides to protect seed and young plants. A commonly recommended chemical is Malthion. It is effective for both seed and grain storage

and is one of the least dangerous chemicals. At time of planting, seed may be sown along with the granular form of carbofuran (Furadan). The granular form can be handled safely by hand. This insecticide is highly effective in controlling spotted stem borer and many other insects. Carbofuran is a systemic acting compound and gives long lasting protection. The liquid form of Furadan is not recommended. It is highly dangerous.

Early planting of early maturing crops is a recommended procedure which utilizes a shorter growing time required to reach maturity before insects increase in numbers as the season progresses.

Disease Control

There are very few references to any disease control for crops grown in Somalia. There are undoubtedly many diseases appearing from time to time. Some may have economic consequences.

1. The first recommendation is to plant varieties resistant or tolerant to prevailing diseases.

2. In the absence of resistant varieties, crop rotations may be effective in disease reduction by lowering the inoculum potential.

3. Use of sprays or dusts to prevent or reduce diseases in crops is often not economically feasible. The exception may be in a highly intensive culture of high value crops. Small farmers could possibly utilize chemicals on small hectarages provided they have reached a higher technological level than that presently known and applied.

4. Control of known seed borne diseases has a high probability of success, because highly effective fungicides are available for seed treatment which does not require expensive equipment or complicated

procedures. A disadvantage is the high cost of chemicals. Many smut diseases are readily controlled with seed treatment fungicides.

5. Seed borne diseases can be greatly reduced by selecting disease-free seed.

Miscellaneous Pest Control

1. Birds can present a serious problem in many crops, especially grains. Most sorghums are vulnerable to many types of birds in all irrigated and rainfed regions. In areas where birds cause serious losses each year, consideration should be given to crop substitution. Other alternatives are to plant varieties which are resistant to birds by virtue of unattractive taste, size and hardness of grain. Early planting of early varieties also may be suited to a particular area where bird populations tend to increase later in the growing season. Early varieties might be harvested before the arrival of large flocks of birds.

Plant Parasitic Nematodes

Some control of certain nematodes is possible by long term rotations of crops not known to be susceptible to the nematodes, by practicing good weed control where weeds may be host plants, and by early planting of early varieties to shorten the period in which nematodes may reduce crop yields.

Use of resistant varieties, if available, is highly desirable. Soil fumigation is effective for reducing root attacking nematodes; however, this is not often a practical solution for many field crops.

Harvesting and Storage

The ideal situation calls for crops to be harvested as soon as seed maturation is complete and sun drying in the field has reduced moisture content to the extent possible for local climatic conditions. Moisture content of grain when harvested should be around 25 percent or lower. Low grain moisture content in the field is preferred. This means less time and effort in drying grain after the harvest.

Crops may be subjected to insect infestations, disease, birds, or continual exposure to rainfall. Occurrence of any of these problems requires crops to be harvested as early as possible to reduce losses.

Sorghum grain is mature when the seeds are fully colored, have begun to harden, and the black layer forms at the base of the seed. Harvesting should take place at this stage of maturation or possibly a little earlier to avoid any depredation losses. Other recommendations for efficient harvesting are:

1. Plant short varieties or types. Short stalks make for easier harvesting.

2. Field transport (oxen drawn wagon). The use of wagons would speed the harvest process. If a tall type is grown, a wagon bed could serve as a platform for workers breaking or cutting heads off stalks. Heads could be hauled in the wagon to a drying area. Stalks could be cut and hauled at the same time if there is sufficient labor and time available.

3. If the crop has not achieved uniform maturation, later maturing heads should be removed as maturation takes place. Do not mix green heads with mature heads, as drying time will be delayed. The same

holds true with mixing green and mature theshed seed.

4. Nonuniform maturation of crops can be alleviated by using improved types or varieties which have uniform maturation characteristics. Uniform maturation can be promoted by planting good quality seed at an even, recommended depth in a properly prepared seedbed so the soil moisture is sufficiently and uniformly distributed. This will support rapid emergence and put all plants at the same stage of growth. All of these recommendations will enhance harvesting.

5. Removal of stalks from fields can provide a source of income if sold for feed or provide feed for farm animals. Prompt residue removal also helps to control insects or diseases by removing host sites for reproduction.

Threshing

Grain separation from heads is facilitated by drying. Do not pile heads in storage before drying, as molds will develop due to excessive moisture in the grain. Heads should be spread out in a loose, single layer on a hard, clean surface to sun dry. After drying as much as possible, grain can be threshed and spread thinly on a hard surface to further reduce moisture content by sun drying.

Grain Storage

Grain entering storage should have a moisture content as low as possible, not over 12 percent. If it is put into storage at contents greater than 12 percent, damage is inevitable. Molds will develop, grain will be susceptible to insects, and heating will occur to further lower quality.

In order to dry grain more rapidly, foreign material such as green or manure crop residue, soil, and immature grain must be removed. Grain will store safely for longer periods of time if the moisture content can be reduced below 12 percent.

Removal of foreign material by hand sorting from grain presents a laborious and inefficient process. Winnowing will speed cleaning of grain. Even superficial cleaning will improve grain quality. Use of some type of screen to separate grain from other material would greatly improve cleaning efficiency and grain quality. A desirable method is to use a mechanical thresher. Small, portable, plot-type threshers or larger portable models can be used on a village basis provided adequate supervision is provided.

Dry grain should be placed in a water tight, rodent proof storage which is as clean and as free of insects as possible. Measures for insect control are:

1. Store grain at the lowest possible moisture content level.

2. Clean storage areas and containers. Remove any remnants of old grain.

3. Spray or dust with an insecticide storage surfaces and sacks before grain goes into storage. Spraying is more applicable to vertical or slick surfaces. Use of Malathion insecticide is recommended.

4. Treat grain for insect control. Although grain may be destined for human or animal consumption, dusting it with an appropriate insecticide at a recommended dosage level is a worthwhile practice to control storage insects. A proper grade of Malathion can also be used

for this purpose. Grain treated with Malathion according to the directions on the container label is safe for food use. This practice should be followed only if farmers applying the insecticide are supervised by knowledgeable people, or if farmers understand principles, hazards, and benefits of insecticide use.

5. Fumigants: Fumigants are very effective in controlling storage insects as well as rodents if storage facilities can be relatively tight or closed to circulating air. Fumigants are very toxic to man and must be used with great care. Fumigant use on small farms is not recommended.

6. Stored grain should be inspected frequently to determine its condition and for insect presence and damage.

The preceding recommendations also apply to earth-pit storage as practiced in the Bay Region. There is conflicting information regarding the quality of grain stored in this type of storage facility. Carefully controlled, adaptive research could lead to specific recommendations regarding practices for earth-pit storage.

Another recommendation for improving grain drying and storage is to reinvestigate the use of small storage units constructed by the Wyoming Team at Bonka. These apparently successful facilities were built with locally obtainable materials and fit the capacity requirements of small farms and for accessibility of loading, unloading and cleaning.

Insects found in stored grain and seed at Afgoi have been identified. Many are common in cereals as well as stored legume seed, oil seed and processed seed products:

1. Rice weevil, Sitophilus oryzae (L.)

2. Maize weevil, Sitophilus zeamais (Motsch)
3. Angoumois grain moth, Sitotroga cerealella (Oliv.)
4. Saw-toothed grain beetle, Oryzaephilus surinamensis (L.)
5. Confused flour beetle, Tribolium confusum (Duval)
6. Red flour beetle, Tribolium castaneum (Herbst.)
7. Cadelle Beetle, Tenebroides sp.
8. Fungus beetle, Carpophilus sp.
9. Rice moth, Corcyra cephalonica (Staint.)
10. Mealworm, Tenebrio sp.
11. Cockroaches, Periplaneta americana(L.)
12. Bean weevil, Acanthoselicides obtectus (Say.)
13. Cowpea weevil, Callosobruchus spp.

Insects identified as eating only whole grains or seeds are numbers 1, 2, 3, 12, and 13. Insects eating only cracked or broken seeds are numbers 4, 5 and 6.

Summary

FMETC graduates would be taught to recognize the various problems discussed in this section and how to do something about them. They would also be shown demonstrations and how to convey messages to farmers. Principles and practices of good crop production could increase crop yields in Somalia many times if practiced consistently on farms. FMETC graduates can make a great contribution to the national food production sector in Somalia if they just teach farmers a few simple cultural practices as described above.

Principles and Practices of Improved Crop Production

All principles and practices described and recommended in the preceding part of this section must be applied in a timely manner to obtain maximum benefits from them. Timeliness is a critical part of any farm management decision. FMETC students will be taught the importance of this fact time and time again. A suggested outline may be used as a guide for teaching extension and research personnel, farm managers and farmers principles and practices of improved crop production in their sequence and relationships to timely operations. Use of germination tests, insecticide application procedures for treating seed, etc. should be an integral part of the training program.

Stages and practices shown in the outline below are placed in chronological order and suggested priority. A practice may be modified to suit a farming system, the level of technology achieved by an individual farmer, and the "Gu" or "Dir" season of the year. The "Gu" season is used to illustrate preparations required for a typical farming operation during one crop season.

Stage 1 -(Preparatory measures taken in February and March)

1. Procure quality seed of the variety or type recommended for your area. If not available, select your own best seed on the basis of appearance and germination test results.

2. Inspect frequently stored seed to be planted.

3. Apply an insecticide as needed to combat insect infestations.

4. Take a representative seed sample for a germination test. More

than one test may be needed. Use seed of the highest possible germination percentage.

5. Inspect and repair farm implements prior to field work. This should be done as early as possible to prepare for the season.

Stage II - (Land preparation and planting in March)

1. Apply manure as early as possible. Apply commercial fertilizer if available or applicable.

2. Prepare bunds around fields as necessary

3. Plow and cultivate to turn under manure or crop residues and to control weed growth.

4. Prepare a firm seed bed by light harrowing and dragging.

5. Treat seed with a fungicide.

6. Plant seed in bottom of furrows if row planted. If not, plant seed as soon after hoeing the holes as possible and press firmly.

7. Plant at the recommended rate and spacing for the crop and your area.

8. If poor quality seed is planted, double or triple the seeding rate. Germination tests and observation can help determine quality.

9. Apply insecticide in the furrow or bed as seed is placed in the soil.

10. Cover seed immediately to the proper depth for the crop. If soil is moist, immediate covering will prevent drying of the soil in contact with the seed.

11. Compact the soil over seed.

Stage III - (Late March, April, May)

1. Inspect fields carefully to ascertain seed emergence.

2. If no emergence is visible 5-6 days after planting in wet or moist soil, examine seed in the furrow to see if germination has occurred.

3. If a considerable amount of seed has not germinated but weeds are emerging, shallow cultivate to remove weeds.

4. Replant fields immediately with reliable seed.

5. After seedlings emerge and grow to 10-12 cm., thin the stand to suggested spacing for the crop if excessive plant population emerges.

6. Continue to inspect fields regularly to determine need for weed or pest control. Shallow cultivate if excessive weed growth occurs. Apply herbicides or insecticides when applicable.

7. If the crop planted is for green manure, pest control may be eliminated unless weed growth is excessive. Plow under when maximum vegetative growth is reached.

8. Continue to inspect fields to determine stage of maturity.

Stage IV - (July)

1. As maturity is approached, grain should be completely colored, begin to harden, and the black layer formed at the base of the seed. Harvesting should take place at this stage to avoid losses due to insects, diseases and birds.

2. Remove crops as rapidly as possible from fields to limit losses. Place heads on a hard, clean surface to sun dry. When heads are as dry as possible, thresh grain carefully to prevent damage. Use a mechanical thresher where possible.

3. Selection of seed for own use may take place at this point. Heads selected should be dried, threshed and stored separately from the remainder of a crop.

4. Remove stalks or crop residue from fields. Clean grain by screening or hand sorting to remove green material and other foreign matter. Dry grain to lowest possible level of moisture content (12 percent or lower). If a reliable moisture tester is available, tests can be made with it. Experience with grain will also give a good indication of moisture content.

6. Clean storage bin or site to remove old grain. Spray grain contact surfaces or sacks with insecticides to control insects. Spray or dust grain or seed when put into storage. Storage site should be bird, rain and rodent proof and shaded. The same procedures are used for earth-pit storage.

6. Inspect grain or seed frequently for insects or heating. Insecticide treatment may be repeated again if necessary. If grain is heating, remove to dry again.

7. Continue to inspect grain storage for insects.

Research Strategy

Research Programs

At the present time there is no active research program in progress which deals exclusively with rainfed crop production. Production problems for most crops are superficially understood or unknown. Virtually no pure seed of improved types or varieties are planted in the rainfed areas.

In suggesting a research program for rainfed crop production, the initial thrust should be on adaptive research to develop improved technology and practices suitable for small farms. Now, the level of technology is low in comparison to modern technology practiced in advanced agricultural production areas. Research should emphasize the importance of sorghum culture in the rainfed areas. As research progresses, as trained technical manpower and support facilities increase, and as results are extended to farmers, increasing attention can be directed to other crops.

There are several sources of applicable technology available in the world today which may be used to great advantage to reduce the time lag from initial development to the release and extension of the improved technology. These sources can be used in an adaptive research program to increase crop production in Somalia.

Several suggestions for the development of a research program are:

1. There is very little improved seed available for distribution to small farms. The Afgoi Research Station is not supplying basic or breeder seed for increase by the FAO seed production program. Because of a lack of improved basic seed from the Research Station, selections of local mixed types are made on the seed production farm and increased to the extent possible with limited staff, equipment, and support. This imposed research activity on the seed production farm is delaying the release of improved seed for distribution to farmers. The function of the seed production farm is to produce seed in suitable quantities in the shortest possible time.

In order to speed the program for the development of improved varieties on the Research Station, direction is needed as well as an initial point to begin the program. One line of adaptive research is shown in the following outline for a method of variety selection.

a. Collect sufficient quantities of all of the sorghum varieties and mixtures in production in the rainfed and irrigated areas. Included in these should be the current local types in production. These are Martin, Local White, Chalky White, Red Compact, and Dark Red Compact.

b. Grow the collection in sufficient amounts to be classified. Promising lines or varieties can be selected for further increase and eventual testing in comparative yield trials. In the past, this selection method resulted in the identification of several improved varieties in a relatively short period at the Bonka Station. Selection criteria should include yield, early maturity, short stature, the preferred color and grain eating quality, stability, drought and pest resistance. These characteristics are not necessarily listed in priority but should serve as a guide in the ultimate selection process.

As the program progresses and problems are identified in the selections, additional extensive collections can be made throughout the Country and the international nurseries in order to expand the germplasm base.

Nurseries are available from the following international agricultural research organizations. In general orders must be placed far in advance to research organizations in order to receive them at an appropriate time.

The International Crops Research
Institute for the Semi-Arid Tropics (ICRISAT)
1-11-256 Begum Pet
Hyderabad 500-016
A.P. India

The International Institute for
Tropical Agriculture (IITA)
Ibadan, Nigeria

Institutions in neighboring countries, the USDA in the United States, FAO, and U.S. universities.

There are additional international research groups which deal with other crops related to the areain which the institutions are located. In addition to nurseries available to fit the general climatic conditions in Somalia, these organizations can provide information on innovations in farming practices and equipment suitable for the small Somalia farms.

Research Training Program

In the initial stage of research training, the ICRISAT program in India would provide valuable training for selected Somali personnel enrolled in short term courses in production agriculture and field research techniques. This would prepare them for positions as technical assistants in agricultural research. Such training would provide personnel for more immediate service while participant trainees in the U.S. would return to Somalia at a later date.

All international agricultural research organizations should be contacted to obtain information on innovations which could be used directly or adapted for use on small farms. Some of the innovations which would serve are:

1. Simple, hand operated threshing equipment.

2. Animal traction tillage and planting equipment.

3. Techniques used to develop maximum efficiency of traction animals (e.g. types of yokes, harnesses, handling and training equipment, etc.)

4. Grain drying techniques, grain storage structures, on-farm techniques for using germination tests and estimating grain moisture content.

5. Recent innovations in mixed cropping or inter-cropping.

Other suggestions for adaptive research to be conducted are as follows:

1. Studies to determine seeding rates, seed spacing, depth of planting, pest control, crop rotations and green manure crops, time of planting, and earth-pit storage improvements.

The Bonka Training Center activity dealing with animal traction should be expanded to include drags or harrows to improve seed bed preparation and moisture conservation, the adaptation of hand operated wheel hoes and single row planters for animal traction use.

Summary

The basic strategy is to increase crop yields by introducing principles and practices presently known to be beneficial for rainfed and irrigated agriculture. In undertaking how improved technology will increase crop production, emphasis is placed on methods which are feasible for small farms. To be immediately and most useful, practices proposed are more labor intensive than capital intensive. The intent is to aid

each farm family to become more productive by making certain that their efforts result in higher yields for the time applied to crops in production.

Much of the information presented in the review of crops grown in the Bay Region was gathered from reports of research conducted from 1966 through mid-1970 by the Wyoming group at the Bonka Research and Training Center located near Baidoa.

Research was directed principally to improving sorghum yields. Selections made from local varieties of sorghum proved to be adapted in varying degrees as evidenced by the improved yields obtained with the use of improved cultural practices. Responses to increased soil fertility levels were notably high. There is little known concerning the problems of other crops in the Region. Maize does not appear to be adapted throughout the rainfed region, but several crops have exhibited good potential for acceptable yields. These are groundnuts, sesame, sunflower, cowpeas, and millet.

In the discussion of principles and practices suggested for improving rainfed crop production, the emphasis was placed on alternative practices which can be useful on small farms at this present low level of technology. Several recommendations are aimed at farmers capable of utilizing higher levels with adequate resources and supervision of practices by trained extension personnel. Other recommendations are made which could be implemented as development and acceptance of higher levels of technology are projected for the future.

Many practices described are specific for Sorghum and similar grain

crops; however, the principles are applicable to other crops grown under both rainfed and irrigated conditions. Modifications determined by adaptive research would be necessary for certain cultural practices used for crops such as groundnuts and sesame. The topics covered in this section were as follows:

1. Importance of timeliness in farming operations.
2. Selection and use of adapted varieties or types for the area.
3. Sorghum seed selection on farms.
4. Animal traction for use in seedbed preparations and moisture conservation.
5. Time of planting
6. Depth of planting
7. Rate of seeding
8. Seed spacing
9. Weed control
10. Use of animal manure, green manure and chemical fertilizers
11. Crop rotations
12. Control of insects, diseases and other pests.
13. Harvesting and Storage.

Also included in the section is an outline for teaching extension and research personnel, farm managers and farmers the suggested sequence of farm practices and operations in a farming system. A suggested research strategy is also included.

Conclusions

By applying the existing modern techniques already developed for rainfed agriculture, there is little doubt that improved crop yields are attainable for most crops grown in the Bay Region of Somalia. Wherever the introduced technology is not applicable, research should be initiated to deal with problems specific to the region.

Sorghum is the most important crop. Any research program developed for the Region should reflect its importance, keeping in mind that the principle limiting factor in crop production is low and irregular rainfall. Major emphasis should be placed on adaptive research which will provide improved practices and technology appropriate for small farms.

An equally important function of a research program is to provide technical training for Somali research personnel. As the competence and number of locally trained technicians increase and participant trainees return to the program, research can be expanded to include other crops in the Bay Region.

Along with the application of proven techniques and the development of improved practices and technology by adaptive research, their practical application in the field will be dependent on the relationship between research and extension functions. Every effort on the part of the research-extension complex must be made to extend the technology widely among farms in order to achieve the ultimate goals of increased crop production and greater well-being for farmers specifically, and for all Somalis generally.

ANNEX 10

LIVESTOCK ANALYSIS

AGRICULTURE DELIVERY SYSTEMS

Introduction

The FMETC should be involved with teaching livestock as well as crop management, otherwise it will do only half a job. Livestock are an important part of the agricultural sector and are, or should be, an integral part of most small farms in an area like Somalia. They can efficiently use range resources that otherwise have no commercial use and thereby provide farmers and the Country with a store of capital and foreign exchange.

This section deals with some of the kinds of technical information that graduates from the FMETC should know if they are to be effective in changing the face of the livestock segment of agriculture in Somalia. It is recognized that the goals and efforts of the MLFR and the MOA-NES will have to become joint goals and efforts, but with proper encouragement and instruction, the joining of forces through the FMETC and the NES should not be insurmountable.

Although much of Somalia is classified as arid or semi-arid, which primarily contributes to the agricultural base of nomads or to the practice of pastoralism, there are large areas (8.2 million hectares) of productive land within the Inter-Riverine Area Region of the Shebelli and Juba rivers that have an even greater potential for livestock production. Within this vast region 50,000 hectares are in controlled irrigation, 110,000 hectares in uncontrolled irrigation, 54,000 hectares in rainfed farming, and the remainder is potentially cul-

tivable land which is principally used for grazing by both small dryland farmers and traditional nomads.

The livestock population in Southern Somalia, particularly within the Inter-Riverine Region is about 1,927,000 camels, 2,340,000 cattle, 805,000 sheep, and 1,568,000 goats for a total of about 6,640,000 head of livestock. This animal production capability represents 20 percent of the total livestock production within Somalia and is being produced on 13 percent of the land base.

Within Somalia there are 180,000 (80 percent in the Inter-Riverine Region) subsistence, dryland farms representing two systems of crop and livestock integration. The first system represents the village of about 5,000 people with each farming family utilizing 305 hectares for cultivation. Cultivated crops consist primarily of sorghum with some sesame, cowpeas, and groundnuts. The livestock population is comprised mainly of cattle, half as many goats as cattle and half as many sheep as goats. Livestock are grazed away from the cultivated land but are returned at night to fenced enclosures within the village. During dry seasons livestock become separated from the confinement of the village and are taken to areas of better pastorage. Usually a small number of chickens such as Rhode Island Red, White Leghorn, and native types or a combination of all three, are found within the village. Chickens are used mainly for festive occasions. Egg production is very low.

The second small farm system integrates the same production base, but livestock are kept separated from the village for most of the year. Periodically livestock are returned to the village to utilize various crop residues and aftermath.

The ultimate goal of the GOS is to become self sufficient in food. At present, the GOS is a net importer of food. The goal of self sufficiency in food production can be greatly enhanced through increased yields at the small farm level. The creation of the FMETC can help achieve this ambitious goal with specialized training in livestock management for farm managers and through extension training programs for the small farmer.

At the present time, farm managers lack the technical skills and knowledge to efficiently operate the livestock production sector on either various state farms or small farms. Small dryland farm managers also lack skills that would allow them to optimize production through crop and livestock management coordination.

Responsibility for livestock and farm management training has been assigned to the MLFR. The National Agriculture College, the Secondary Agriculture School and the Veterinary College have provided the curriculum and training. The first two institutions have lacked the expertise to provide appropriate training for farm managers and livestock specialists. The Veterinary School, however, has a good program in applied animal health, but lacks the technical competence in other areas of animal husbandry. The MOA maintains the only NES, but extension agents are only modestly trained in techniques of crop production and have had no training in principles and methods of livestock management.

Linkages between the MLFR and the MOA are vague, and as stated, the NES deals primarily with crops. Emphasis in the MLFR has been in animal

health utilizing a cadre of veterinarians and assistant veterinarians officed at the region, district and village levels. Livestock research strategy has been limited to animal health programs.

Current Project

The proposed FMETC will emphasize training and development of technical skills in livestock production (i.e. meat, milk, fiber, etc.) at the farm manager level and provide competent expertise via the NES to management of small farms.

Livestock Extension Training

Emphasis of livestock extension training will be to assist managers of small dryland farms to improve animal health through a concentrated program of vaccination and parasite control, improved feeding practices, improved management practices and animal selection.

Livestock Research Strategy

Emphasis on livestock extension training will not only help implement new skills and technology but will utilize pertinent information from specific research programs conducted in Somalia, as well as in other places around the world. Research projects utilizing cattle, sheep, goats and poultry will be conducted at the Afgoi Research Center, the proposed FMETC, and other MLFR programs at selected villages near Baidoa. Research emphasis will be aimed at increasing meat, milk, fiber and egg production. Facilities to maintain sheep, goats, cattle, and poultry for research will need to be established at Afgoi.

Linkages

The proposed FMETC project will establish a trained cadre in livestock production for MLFR, provide livestock extension through NES, and disseminate applied research information to managers of small dryland farms. Research goals and objectives will link the MLFR with the NES through a national coordination committee.

Project Specific Analysis

Technical Feasibility

Self sufficiency in food can be obtained within Somalia providing a farm manager and extension training program can be effectively implemented. The proposed FMETC will utilize present livestock facilities at Afgoi and within selected villages near Baidoa and other centers.

Livestock Extension Training

Livestock extension training will deal with all aspects of animal husbandry utilizing cattle, goats, sheep and poultry, however, emphasis on substantially increasing meat production will be directed towards the level of small dryland farms. Greater utilization of sheep and goats at the village level will be stressed. Livestock extension training at the FMETC will consist of:

1. Genetics: There are 4 breeds of cattle (Bora, Dawara, Sunka, and Gasaara), two breeds of goats (Mudugh also called Obgal and Ogadan and the Bimal which is also called Gazze and Tunni) and the black-headed, fat-rumped sheep. Poultry varieties consist of a native breed,

two exotic breeds (Rhode Island Red and White Leghorn) and various hybrids of the three. There are five breeds of camels (Congial, Gazze, Elai, Mudugh and the Benadir), however, camels will not be considered as a production resource during the initial phase of the FMETC program.

The genetic potential of livestock can be changed by two means--selection and cross breed mating. For cattle there are four indigenous breeds that can be utilized in cross breeding programs. The 21st of October Dairy Farm has already implemented a cross breeding program primarily utilizing the Holstein-Friesan breed crossed on various native cattle breeds to increase milk production. Principles and methods for improving sheep and goat production at the present time will involve various aspects of selection. Farm managers and FMETC graduates will be trained in the following:

a. Accuracy in measuring desirable traits and use made of records obtained.

b. Animal selection techniques applied.

c. Phenotypic variability in traits being considered.

d. Heritability or fraction of phenotypic superiority transmitted.

Productivity traits that should be considered are:

a. Cattle--adaptability, fertility, growth rate, carcass quality, feed use efficiency and milk production.

b. Sheep--adaptability, prolificacy, fertility, growth rate, carcass merit, and feed use efficiency.

d. Poultry--adaptability, growth rate, feed use efficiency and egg production.

2. Reproduction: Reproduction is of primary importance in livestock production programs. Various aspects related to increased production should be understood by livestock farm managers and extension agents. Factors affecting fertility (i.e. age, general physical condition, libido, etc.) should be understood and related to production. For example: Selection for early puberty will result in increased production. Additionally, age of first breeding can increase the number of offspring born.

3. Health: Although animal health and diseases are primarily under control of the MLFR, much can be gained by farm managers and extension agents by understanding rudimentary principles. Economic loss to the Somali livestock industry due to disease and parasites through death, loss of weight, inefficient utilization of feed and carcass degradation is extremely high. Estimated losses from death are as high as 40 percent of those that survive birth. Farm managers and extension agents should be taught that sanitation and disease prevention should be a primary consideration. Items to be considered are:

a. Adequate water resources.

b. Appropriate facilities.

c. Causes of death.

d. Preventative treatment (i.e. dipping, spraying, drenching, vaccinations, etc.)

e. Lambing or calving difficulties

f. Foot diseases and appropriate treatment

g. Castration.

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4. Nutrition: Feed represents the largest single production cost in all types of livestock operations. Knowing what to feed is just as important as knowing when animals should be fed. Nutrients of primary importance in livestock production are water, energy (as measured by total digestible nutrients), protein (as indicated by crude or digestible protein), and minerals (particularly salt, calcium and phosphorus). Total digestible nutrients and digestible protein have been established for most major crop products available in Somalia. (See the US National Council Bulletins on Nutrition Requirements for Cattle and Sheep). At present Somalia has an excess of crop residues that could double or triple the growth and finishing rates in livestock and poultry, Table 1. Farm managers and extension agents should have a basic understanding of:

a. Nutritional requirements of livestock (i.e. during estrus, anestrus, lactation and post partum interval to breeding, etc.).

b. Methods of formulating rations.

c. Items to be considered in formulating rations:

i. The performance of alternative feeding programs.

ii. Type of livestock to be fed.

iii. Biproduct sources to be used in supplemental rations.

Adequate nutrition will result in faster growth, more animals reaching puberty at an earlier age, higher reproductive rates, and reduced interval between birth and the marketable product. Ultimately, better nutrition will result in a better quality and increased quantities of meat and milk.

Table 1. Summary of the Potential By-Products in Somalia and Their Nutritive Value When Used as Animal Feeds

By-Products	Annual Production	TDN	Annual TDN Production
	Tons	%	Tons
Banana Stems	200,000	50	100,000
Sorghum and Maize Stover	600,000	52	310,000
Rice Straw	6,000	40	2,400
Wheat Straw	3,000	50	1,500
Sesame Stalks	150,000	40	60,000
Sugar Cane Tops	20,000	30	6,000
Bagasse	133,120	41	54,579
Cotton Stalks	20,000	40	8,000
Cotton Seed Hulls	660	44	290
Fruit Processing Products	1,200	55	660
Wheat Bran	4,390	66	2,897
Sesame Cake	10,000	71	7,100
Cottonseed Cake	3,000	70	2,100
Groundnut Cake	4,000	70	2,800
Sorghum and Maize Bran	5,500	66	3,630
Blood Meal	917	84	771
Meat and Bone Meal	3,207	65	2,084
Fish Meal	1,000	72	720
Total			565,531

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5. Management: Management of livestock and poultry, physical facilities available and related financing are the most important factors that will determine whether a particular livestock production system will be profitable. Without exception, producers rated as good managers will consistently show a profit. Farm managers and extension agents need to become familiarized with range management techniques and associated supplemental feeding programs. Factors that should be considered are:

a. Deferred grazing systems.

b. Rotational grazing systems.

c. Restricted time of grazing.

d. Use of crop residues, by-products and aftermath.

Management principles and practices related to improved production should be familiar to the farm managers and extension agents. These should include:

a. Flock or herd requirements.

b. Feeding.

c. Breeding practices.

d. Calving or lambing.

e. Weaning.

f. Health

g. Selection.

6. Marketing: Marketing is the job of assembling, sorting, transporting, processing and pricing livestock and poultry, and distribution of their subsequent products. Although the marketing systems in Somalia

are rudimentary, nevertheless, farm managers and extension agents should be aware of some of the principles involved. These include:

a. How to make marketing decisions.

b. Pricing and competition

c. Calf, lamb and kid feeding industry problems.

d. Grades and grading.

e. Slaughtering and processing.

f. International trade opportunities.

Livestock Research Strategy

Cattle: At present, research in cattle emphasizes increased milk and meat production. Cattle under present grazing systems may only produce 1-3 liters of milk per day during lactation and take 4-5 years to reach an obtainable size for marketing. The 21st of October Dairy Farm at Afgoi has been conducting research which will result in higher milk yields, better feed utilization, faster rates of gain and better carcass quality. Probably research in cattle production will continue on the same basis under the MLFR and will not be discussed further.

Sheep and Goats: Sheep and goats represent a greater potential in terms of increased returns for small dryland farms than any other segment of the livestock industry. This conclusion is based on:

a. Lamb and mutton are the meat of choice in a moslem society.

b. Greater return on net input, Table 2.

c. Faster turnover of investment, Table 3.

d. Lower risk.

e. Lower technical input requirements.

f. Greater foreign market potential.

Table 2. Animal Unit and Production Return Index

Species	Livestock Unit	Livestock Equivalent	Price/ Animal	Adjusted Return
	AV's	No.	So. Sh.	
Camel	1.2	1.2	2,150	2,588
Cattle*	1.0	1.0	1,900	1,900
Goats	0.1	10.0	350	3,500
Sheep	0.1	10.0	500	5,000

* A mature cow or steer weighing 250 kg. is considered as 1 livestock unit or AU.

Table 3. Comparative Production Unit Levels Between Cattle and Sheep-Goats Under Present Grazing Systems

Item	Cattle	Sheep-Goats
Age at 1st parturition	4.5 yrs.	1.5 yrs.
Number of offspring	3.0	7.0
Mortality rate	0.4	0.4
Offspring surviving	2.4	4.8
Average finished weight (kg.)	250.0	40.0
Livestock Unit (AU)	1.0	10.0
Accumulative weight (kg.) (AU/Production Unit)	600.0	1,920.0
Unit return, So. Sh.	4,560.0	24,000.0

To realize this potential for increased production, dryland farmers at the village level should increase the number of sheep and reduce the number of cattle. Dryland farmers would have to shift production from extensive to semi-intensive systems also. As cited, the conversion ratio could be as high as 1 to 10 in the direction of sheep. Goats should also be maintained in herds at present levels.

If lambs and kids can be weaned 3-6 months and maintained within confinement prior to and after weaning, total animals that would be required to keep on the range to produce the same number of marketable livestock could be greatly reduced. Consequently, small farms can decrease total animal numbers on the range to allow range production to increase. Concommitantly, they can increase female numbers. An optimum level of meat production, therefore, could best be obtained by maintaining female numbers for breeding that would provide the most offspring without over grazing the range or pastorage that is associated with the proximity of the village.

Conservative estimates of range carrying capacities, losses, levels of production and rates and efficiency of gain involved in extensive versus semi-intensive production programs are provided in Tables 5 and 6.

The information in Table 5 dealing with extensive sheep production demonstrates that the older the age at which sheep are marketed, the greater the grazing pressure on the range due to increased numbers of animals, the greater the loss, and the less efficiently the available range feed is utilized. For example total sheep numbers could be

Table 5. Estimated Production Values for Small Farm Sheep Production in Areas of Dryland Agriculture, Somalia

Production Item	Age of Sheep					
	3-6 Mo.	1 Year	2 Years	3 Years	4 Years	5 Years
Reduction in the total number of sheep if marketed as lambs rather than at older ages (%)	0	32	63	90	115	136
Loss (due to death) from sheep of older ages compared to lambs (%)	0	5	14	23	31	38
Kgs. of live weight available for market per 1000 breeding stock	10384	13756	16164	16618	14945	13454
Measures of feed efficiency						
Total feed consumed (kg)	207	411	852	1386	1824	2262
Net live weight gain (dg)	16	24	31	36	36	36
Daily gain (kg)	.118	.066	.042	.033	.025	.020
Conversion ration, kg. feed/kg. gain	13:1	17:1	27:1	38:1	51:1	63:1
Increased conversion ratio compared to lambing percentage (%)	0	31	108	192	292	385

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Table 6. Estimated Production Values for Lambs Grown and Finished Under Semi-Intensive Lamb Production Systems on Dryland Farms, Somalia

Begin. Age	End. Age	Feed. Period	Begin. Weight	End. Weight	Weight Gain	Feed Cons.	Daily Gain	Conversion (kg. feed/kg. gain)
Days	Days	Days	Kg.	Kg.	Kg.	Kg.	Kg.	Ratio
135	255	120	20	39	19	174	.16	9:1

decreased by 136 percent if lambs were marketed at 6-12 months of age compared to 3-5 years. Also, 40 percent of lambs available for market at six months of age would die if they were not marketed until they were 4-5 years of age. A smaller proportion of feed eaten by sheep is converted to meat when sheep are marketed at an older age, because of reduced growth rate due to maturity and also resulting from inadequate quality and quantity of feed particularly during the bi-annual dry season, and, because of increased maintenance requirements as they got older. From the example given in Table 5, 13 kg. of feed are required to produce a kg. of live weight in lambs up to six months of age. Sixty-three kgs. of feed are required to produce a kg. of live weight gain if sheep are kept to 4-5 years of age. This means that the amount of feed required to produce a 4-5 year old animal on a per kg. basis is 385 percent more than that for lambs 3-6 months of age. Weight losses during dry seasons would require an additional 256 percent more feed or a total of 641 percent. Kgs. of live weight for lambs available for market for each 1000 head of breeding stock under optimal conditions is estimated at 10,384 lambs and increases each year of age until it reaches a high of 16,618 head for three year old animals. It then drops to 13,454 head at five years of age. The higher weight of sheep, if marketed at 3 years of age instead of at the younger age, is somewhat misleading because under proper management mother ewe numbers could be increased resulting in production of more lambs for market providing lambs are removed from the range. Also, a higher level of production efficiency would be maintained by feeding rather than grazing lambs.

If sheep are placed in semi-intensive production programs, feed lots or confinement at the village, they will gain more efficiently, although the cost of feed and of overall production will be higher, and be ready for market at an earlier age than if left entirely on the range. From the information in Table 6, lambs that are placed in the feed lot for four months, from about 4.5 to 8.5 months of age, will require approximately 9 kgs. of feed for each kg. of live weight gain. They will gain weight at the rate of .16 kg. per day. The 9 kg. of feed required to produce a kg. of gain in the feedlot can be compared to estimates in Table 5. Under extensive management, gains would be 13 kg. up to 3-6 months of age, 17 kg. to 1 year, 27 kg. to 2 years, 38 kg. to 3 years, and 40 kg. to 4-5 years. The estimated average daily rate of gain of .16 kg. for sheep in the feedlot can be compared to .12 kg. for 3-6 month old lambs, .07 kg. for sheep 1 year old, .04 kg. for sheep 2 years old, and .02 kg. for sheep up to 4-5 years of age under extensive programs.

Although this information provides only estimates considered to apply to general conditions in Somalia, it demonstrates the advantages that dryland farmers would have if they removed their sheep from the range for market at a young age. It also demonstrates that sheep can be grown and finished for market more efficiently under semi-intensive management conditions than under extensive conditions.

The situation for goats is similar to that described for sheep. However, goats are relatively less efficient than sheep in the feedlot, but are better adapted for utilizing rougher forages.

These production values are only estimates. Actual values for Somalia are not available. (Research designed to answer some of these questions should be conducted.) Also, no single value can adequately represent all situations because of great variations in range and management conditions. Values used were based on information gathered on extensive sheep production in the U.S. and the Middle East. Other values are estimated from modified information based on semi-intensive production systems in the Middle East.

Research Strategy

There has not been any practical research conducted on sheep and goats in Somalia and, therefore, reproduction and production potentials are virtually unknown. Research programs that should have first phase priority are:

1. To establish reproductive parameters, i.e. length of estrus, length of the breeding season, optimal times for breeding, length of gestation, post partum interval to first estrus and lambing rates.

2. To establish the most feasible method to increase production in terms of ram/ewe ratios, docking tails, culling, measuring fertility, etc.

3. To establish the most efficient system for finishing lambs and kids on a least cost basis.

4. Determine production effects of outbreeding in conjunction with various degrees of selection.

On a more extended research basis (5-10 years after project implementation) areas for consideration should include:

1. An introduction of a larger, faster gaining and more efficient sheep and goat for hybridizing with the indigenous breeds. This has already been accomplished in some parts of Africa utilizing the black-headed, fat-rumped sheep crossed with the Dorset sheep. Also, the Boar goat has been crossed with other indigenous African breeds of goats. The results have been phenominal in terms of hardiness, adaptability, reproduction and production.

2. Improve milk yield in indigenous goats by selection and hybridization.

3. Determine the feasibility of developing a wool sheep with a fleece potential for the carpet industry of the Middle East. Sheep can have a dual production potential--meat and wool.

4. Investigate ways to improve methods on the storage of animal products since the small farms have little access to refrigerated facilities.

   a. Meat--techniques of drying.

   b. Milk--biproducts such as cheese, ghee and yogurt.

   c. Skins--drying and tanning.

5. Determine the feasibility of feed lot operations.

Since irrigated land provides the greatest resource of crop by-products, feed lot operations for finishing cattle, sheep and goats in close proximity to irrigated farms could substantially increase meat production. Small farms could provide animals for finishing and,

therehy, reduce total numbers on range lands. The result would be a faster turnover of animals, increased production and a greater return of income to dryland farmers.

For poultry, a village flock improvement program should be developed by using surplus cockerels of improved, imported stock. Females of imported breeds will not survive under village conditions. The indigenous fowl cannot be adequately used on small farms because:

1. Bird size is too small.

2. Egg numbers laid per year per bird is too low to make commercial production economical.

3. Egg size is too small to command attention and demand in the market.

The potential for developing a poultry industry on small farms will rest with demonstration flocks at Afgoi in the initial phases. Availability of cockerels and applied technology through the NES will encourage the farmers to invest in poultry as an additional source of revenue (See: Poultry Production Possibilities for the Democratic Republic of Somalia by Charles L. Davis, Contract No. AID/AFR-C1482.)

The guinea hen, native to Somalia, should also be considered as a potential poultry resource. The guinea hen is well adapted to environmental conditions in Somalia.

Linkages

Integrated research utilizing crops and livestock would automatically link the MOA to the MLFR. New technology would be passed

on to farmers through the NES which in turn links the NES to the total program. The accrued results would reach about 3 percent of the small farms each year during the first eight years, 5 percent per year for the next 9-13 years, and 7 percent per year during years 14-20. Success during any phase would have a mushrooming effect on implementation. Farmers that are somewhat hesitant in accepting a new production technology will gravitate to the successful farmer who adopts new and improved programs from FMETC graduates.

Economic Feasibility

Cost and Returns

Cattle: At the livestock farm manager level, which would primarily involve dairy operations, improved management, improved nutrition, hybridization and selection could result in increases from 1-3 liters of milk to 3-9 liters under less intensified dairy programs and from 6-8 liters to 18-20 liters in the larger dairy farm operations (100-500 cows). (For further information on the dairy potential in Somalia see the report on Livestock and Dairy Production in Somalia with Suggested Course of Action by John M. Halpin, 1978.)

Sheep and Goats: Sheep and goats can provide the greatest and fastest economic returns on small farms. Total meat yield of sheep and goats adjusted to 1 livestock unit is 400 kg. versus 250 kg. for range cows. Based on animal equivalents at current prices, sheep would provide a net return of 5,000 So. Sh. whereas cattle would provide 1,900 So. Sh. or a net increase in income of 163 percent. Com-

paring losses during the 1974-75 drought period, 40 percent of the sheep and goats died and 30 percent of the cattle. Adjusting the income to losses related to the drought, a comparison of net incomes would be 3,000 So. Sh. for sheep and 1,330 So. Sh. for cattle. Goats would be between sheep and cattle.

Livestock Extension Training: The application of simplified livestock management techniques via the NES could increase reproductive rates from 70 to 90 percent, reduce mortality from 40 to 10 percent and reduce marketing intervals in sheep and goats from 3-5 years to 1 year or less and for cattle from 4-5 years to 2.5 years. Consequently, current production levels would increase by 150-200 percent during the NES phase 1 period.

Livestock Research Strategy: Research will be directed to increase sheep, goat, and poultry production on small farms. Lambs or kids born per parturition will be increased from .9 to 1.2 per female. Lambing and kidding rates will be increased to 90 percent. Marketing intervals will be reduced to 1 year or less and breeding regimes will lead to 3 lamb and kid crops every two years. The total cumulative effects would result in a 250 to 350 percent increase of meat production from present levels. Poultry production will increase similarly if recommendations by Charles L. Davis are adopted.

Measurable Costs and Benefits

Livestock Extension Training: Input costs of the NES during phase I (390 farmers affected) will result in a 150 to 200 percent increase in net income utilizing sheep and goats and an additional 153 percent increase in net income if small farms shift production

emphasis from cattle to sheep and goats.

Livestock Research Strategy; Input costs will begin immediately upon initiating the project and will result in a substantial increase of 150 to 200 percent in net income and will effect 3 percent of the farmers each year in phase 1 and 5 percent per year in phase II. Long term research over 15 to 20 years will result in additional increases in production of 100 percent above present levels. At all phases, the ultimate benefit will assist small farms to produce a surplus in food and thereby provide for a better way of life for farmers.

An increase in the present standard of living, resulting from the dissemination of training and technology from the FMETC will bring about greater cooperation and involvement between the MOA and the MLFR and subsequently reach large numbers of dryland farmers.

Research facilities to maintain 100 head of sheep, 100 head of goats and 100 head of chickens should be established at Afgoi as an early part of the FMETC training program.

Social Soundness Analysis

Farmers have five basic needs in order of ascending hierarchy: physical, safety, social, self-esteem and self-actualization. Physical need is most important. Before farmers can enjoy any other benefits he must first satisfy his need for food, shelter and water. Considerable energy is expended in building housing facilities, granaries, planting, cultivating, harvesting, acquiring water and taking care of livestock. The FMETC via the NES will reduce the time

needed to maintain livestock enterprises and bring substantial increases in food production and net income.

Safety is provided by numbers of village people living and working together. Increased livestock production will further cement families to villages with order being maintained throughout district, regional and national levels. Although the FMETC is largely designed to improve the first three basic needs, the final needs of self-esteem and self-actualization will be obtainable. This will be accomplished by additional economic security and a feeling of success and accomplishment as the quality of village life is improved. Success at the subsistence farm level will provide greater cooperation between institutions of Government with concomitant confidence in the NES by farmers. Research will provide major inputs to increased production in various segments of the livestock industry.

Administrative Feasibility

Administrative feasibility will be accomplished by staffing the project with qualified expatriates. Research in livestock will be planned by expatriate livestock specialists and coordinated by the FMETC leader. Results that will increase livestock production at the village level will be properly disseminated by the NES. In affect, NES agents will coordinate methods of implementation as well as identify new problems that are related to livestock production at the village level.

Environment Concerns

Livestock Extension

The goal of the FMETC will be to increase livestock production on small farms by taking appropriate measures to reduce total animal numbers and increase quality of production. This will be accomplished by improving:

1. Animal health.
2. Farm finishing/fattening.
3. Improved management.
4. Controlled grazing.

The effects would reduce grazing pressure on the range and provide quality livestock production.

Livestock Research Concerns

Research will be directed toward improving animal production efficiency in terms of feed utilization, faster rates of growth, better finishing and higher reproduction rates. Associate effects would result in fewer numbers of higher producing livestock utilizing less land resources. The outcome would be increased meat production, increased net income and reduced pressure on the ranges.

Facilities for livestock research will have to be built at the Afgoi location. Care will be taken not to locate them where they can become obnoxious to people or in some cases attract insects and pests.

Implementation Plan

Implementation to increase livestock production on small farms will occur in five sequential stages:

1. From year 1 to year 5--Research will develop techniques in management which will increase production without major capital additions. That is, reduce the number of males and replace with females, animal health, farm feeding, reduced mortality rates, etc. Research will be directed towards measuring reproduction and production under optimal conditions.

2. From year 6 to year 10--Research will involve developing improved indigenous genetic stock through out-breeding and intensive selection. Superior genetic stock, particularly in sires, will be utilized via the NES to improve livestock on small farms. Research also will be conducted to establish new and improved methods for storage of animal products.

3. From year 11 to year 14--Research will involve importation of exotic stock that will add genetic visability to indigenous breeds. The NES involvement will be a continuation of the second stage.

4. From years 15 to 17--Research will be an extension of phase 3 with improved stock being incorporated into small farm regimes. The NES will provide the implementation by supervising various new management techniques that are necessary to maintain hybrids at the village level.

5. From years 18 to 20--Improved genetic stock will be provided on a wider basis to selected farmers. In addition, the NES involvement will continue with application from phases 1 to 4. By year

20, 90 percent of the 180,000 small farms will have been introduced to one or more stages in the implementation stratagem.

Summary and Conclusions

The goal of self sufficiency in food production set by the GOS can be greatly enhanced by increasing livestock production on small farms in the dryland area. At the present time, farmers lack skills and technology that would allow them to optimize production by maintaining fewer numbers of higher producing livestock.

The ultimate goal of the FMETC will be to establish training, technological transfer and applied research which will substantially increase the level of production on small farms. Pertinent information and training will be disseminated to the small farmers by a well qualified cadre of extension agents (NES) that have been trained at the FMETC.

Livestock training for extension agents and farm managers at the FMETC will involve basic principles of genetics, reproduction, health, nutrition, management and marketing. Objectives of extension agents will be to assist farmers in increasing livestock production by establishing appropriate measures which will reduce total animal numbers while increasing the quantity and quality of production. This will be accomplished by training in various aspects of animal health, farm feeding/fattening, improved management and controlled grazing.

A series of extension publications on docking lambs, aging,

culling and selection, breeding, feeding, trimming feet, operations and management, animal health, etc. will be prepared and made available to farmers through the NES.

Dryland farmers should emphasize greater utilization of sheep, goats and poultry. Sheep and goats will provide the greatest economic returns. The order of meat choice in the Somali society is lamb, mutton, goat meat, beef and camel. Compared to cattle, sheep and goats have a greater return on net input, faster turnover of investment, lower risk, lower technical input requirements, and they have a greater foreign market potential. Placing more emphasis on sheep and goats as compared to cattle will result in a 163 percent increase in net income under present management systems. Improved livestock management of sheep and goats will result in a 150 to 200 percent increase in net income. Research will result in an additional 100 percent or more increase in net income utilizing techniques of selection, oubreeding and hybridization. Poultry production will be improved in a similar manner.

Integrated research and extension training in livestock production will link the MOA to the NLFR. New technology will link farmers to the NES. Farmers that adopt new and improved technology and management programs will become examples to other farmers. The total effects of linkage will tie the national goal of self sufficiency in food production to the small dryland farms in the Country.

Overall Research Stratagem

Except for cattle, there has not been any practical research conducted on domestic livestock in Somalia. Sheep and goats represent the greatest production potential for small dryland farms, however, their reproduction and production parameters are relatively unknown. Research activities, therefore, that should be given first priority are:

1. To establish reproduction parameters in sheep and goats.

2. To determine the most efficient system for finishing lambs and kids.

3. To establish methods to increase production.

4. To determine production potentials from outbreeding in combination with various degrees of selection.

5. To establish village poultry flocks, upgrading programs using surplus exotic cockerels.

Following phase 1 priorities, research should be extended into the following areas:

1. Introduction of larger, faster gaining and more efficient sheep and goats for hybridization with indigenous breeds.

2. Improve milk yield in indigenous goats by hybridization and selection.

3. Investigate the feasibility of utilizing a combination of mutton/wool sheep for dual, product purposes.

4. Improve upon or develop new methods for storage of animal products.

5. Evaluate the potential for feedlot operations, particularly in areas associated with irrigation.

Implementation of research will occur in five phases:

1. The first five years: Establish management techniques which will increase production without capital requirements. Research will be directed towards measuring reproduction and productive parameters in sheep and goats, establish improved methods for poultry production, and determine the potential use of the guinea hen.

2. Years 6 to 10: Research will involve the development of improved indigenous breeds by selection and out-breeding. Limited numbers of superior sires will be provided to the farmers. Ways to improve storage of animal products will be investigated.

3. Years 11 to 14: Research will involve the importation of exotic stock that will add genetic superiority to the gene pool of indigenous breeds. Additional numbers of superior sires will be provided for the small farms.

4. Years 15 to 17: Research activities will be an extension of phase 3 but with greater emphasis on selection for specific production traits. Additional phase 2 superior rams will be provided to small farms.

5. Years 18 to 20: New and improved genetic stock will be provided to farmers on a large scale.

The establishment of better management practices with phase 1 research will result in a 150 to 200 percent increase in net income and will affect about 3 percent of the farmers per year in the early

part of the program. Shifting production emphasis from cattle to sheep will result in another 163 percent increase in income without requiring heavy capital investment. Long term research, phases 2-5, involving improvement of production performance in indigenous breeds by selection, outbreeding and hybridization will result in an additional 100 percent increase in income. Improved production categories are: meat, milk, skins, hides, wool, and egg production. All phases of research that will increase the standard of living for farmers will bring about greater cooperation and involvement between the MOA, the MLFR and the FMETC as well as other GOS institutions.

Animal research programs should be planned by the expatriate team and short term consultants according to the overall objectives of the project.

ANNEX 11

ECONOMIC ANALYSIS

AGRICULTURE DELIVERY SYSTEMS

Extension Structure and Training

The extension structure will be such that the flow of information for the current state of farm management arts and sciences appropriate for Somalia will not be impeded. To assure that this will be the case, an expatriate with the FMETC (the Principal and Chief of Party) and an administrator from the NES will be assigned the job of keeping the channels open through which information flows to farm managers and other farming situations, as well as the reverse flows.

Also, the major purpose of the FMETC is to prepare Somalia to extend information to and bring about appropriate technological changes in farm management at the farm level. The FMETC and those expatriates and Somalis working at the Center will be evaluated on their success or failure to achieve changes in farm management practices through students graduating from the Center, as well as from those who receive educational boosts out of Somalia.

The present Somali institutional structure and the enthusiasm for food production increases are providing a climate favorable for accomplishing the necessary changes in farm management technology suggested by this project. Therefore, the economic projections and analyses are prepared with confidence in their reasonableness.

Measurable Costs and Returns

Measuring costs and returns for training projects and research

programs can only be approximate. This is so for two reasons:

1. The estimates are made for future years.

2. Three assumptions must become facts in future years.

a. Training programs or research will produce the changes anticipated.

b. Farmers will adopt changes recommended by graduates of the FMETC or the technology released from research.

c. Prices in the future will in fact be those used in the analysis.

With the above suppositions, using professional insights make it possible to set some realistic bounds around the single valued estimates used in the analysis, thereby minimizing the error that will develop between estimate and fact as the years pass. With this in mind, the figures in the following analysis should be read plus or minus 15-20 percent. And, analyses should be revised often throughout the projected period.

Innovation Schedule

A time period of 20 years for the economic analysis is recommended even though the first phase of the project is only for five years. In the first year after the first FMETC students graduate, they will reach about three percent of the small farm farmers in the Country and about the same percentage of new farmers each year through year 8, Table 9.

After the first eight years about 25 percent of the farmers may be changing management practices for the better one way or another.

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Table 9. Innovation Schedule Suggested

Code Year	Percent of Farms Inf.	Number of Farms/Year	Accumulative Total Farms Influenced*
0 Base	0	0	0
1	3	1080	1080
2	3	1080	2160
3	3	1080	3240
4	3	1080	4320
5	3	1080	5400
6	3	1080	6480
7	3	1080	7560
8	3	1080	8640
9	5	1800	10440
10	5	1800	12240
11	5	1800	14040
12	5	1800	15840
13	5	1800	17640
14	5	1800	19440
15	6	2160	21600
16	6	2160	23760
17	6	2160	25920
18	6	2160	28080
19	6	2160	30240
20	6	2160	32400

* If there are 36,000 rainfed farms of 5 hectares each, no more than 90 percent will ever be reached.

For the next six years FMETC graduates may reach an average of about 5 percent of the farmers each year who will begin to innovate in some way. The first 25 percent will be in the second or third stage of applying new but appropriate technology. After 14 years about 55 percent of the farmers will be using innovations in their management practices. For the next six years FMETC graduates will bring about management changes on an additional 6 percent of the small farms per year. The first 25 percent will be in the third, fourth or fifth stage of management change; the second 30 percent will be in the second, third or fourth stage. At year 20 about 90 percent of small farmers will be innovating on their farms in one way or another. That is the most that will ever be affected.

After about five years, the impact of FMETC graduates will begin to be felt in areas outside of the interriver area. Such geographic linkages will be encouraged until all small farm and livestock operators in the Country will be influenced by FMETC graduates through NES programs.

The economic analysis will be based on changes in yields that will take place during each of five innovative periods. During the first five years, they will increase about 100 percent over base year yields. During the second stage of five years, they will increase another 75 percent over the base year. During the third stage of four years, they will increase another 60 percent over the base year. During the fourth stage of three years, they will increase another 40 percent over the base year. During the fifth stage of three years, they will increase 25 percent more over the base year. Over 20 years yields of

crops and livestock will increase about 300 percent over base year yields with a minimum of capital investment required. After 20 years innovating farmers should be prepared to accumulate resources under cooperative or corporation farming systems so modern technology can be used. They will then realize another big jump in yields and efficiency.

Composite Crop Farm Analysis

The NES will utilize most FMETC graduates for some time in the future. One year after the first class graduates some farms should be innovating at stage 1 level which will cause yields to increase. The process will continue until innovation stages become shorter because fear of change will decrease. Over the 20 year period crop yields could change as much as 300 percent with a minimum of capital expenditure, Table 10.

As time passes through innovative stages under the training of FMETC graduates, technology will be substituted for labor. In the fifth stage a family will be able to farm twice as much land as in the baseyear. Therefore, total crop production will increase not only because of higher yields per hectare, but because of an increase in hectares, Table 11.

Since land is available in rainfed areas, there should be no problem in expanding farm size as indicated. Little capital would be needed. In fact, clearing land is a good way to convert labor to capital. If brush is removed and trees and shrubs are cut about a meter from the ground, clearing a hectare would take a crew of five

Table 10. Changes in Yields Over Innovation Stages

Years Innovation Stages	Yields Percent Inc./Yr.	Years Per Stage	Total Percent Increase
0 Base	0	0	0
1-5	20.0	5	100
6-10	15.0	5	75
11-14	15.0	4	60
15-17	13.3	3	40
18-20	8.4	3	25

Table 11. Changes in Farm Size Over Innovation Stages

Years Innovation Stages	Farm Size (has.)
0 Base	5
1-5	6
6-10	7
11-14	8
15-17	9
18-20	10

people about 15 days. Working at a rate of four So. Sh. a day would put the equivalent of 300 Sh. into a hectare for the cutting. Later when the stumps rot and are removed another 300 Sh. would be put into a hectare. Thus, 600 Sh. of family labor would be turned to capital. This gives the basis for placing a value on the land. Using an interest rate of 15 percent provides an estimate of annual interest costs of 90 Sh. per hectare, Table 12.

Four crops will be grown on the composite crop farm--sorghum, cowpeas, sesame, and aftermath. Sorghum and cowpeas will be grown on the same land each year. A crop hectarage schedule by innovation stages is needed, Table 13.

Crop product prices will undoubtedly increase over a 20 year period as FMETC graduates influence product quality and marketing practices, Table 14.

If all the information in the following Tables along with base year yields are put together, a composite flow for 20 years can be presented including changes in yields, total production, prices, gross returns and annual increments in production and returns, Tables 15 through 18.

Using information from the Tables and from other sources, it is possible to construct a composite crop farm for the base year and follow it through each of the innovation stages, Table 19.

Composite Livestock Unit Analysis

It is impractical to leave livestock out of the report just because they are not included in the MOA package. Farmers raise

Table 12. Investment in Land and Annual Interest Costs

Years Innov. Stages	Farm Size	Land Value	Interest Costs at 15%
		So. Sh.	So. Sh.
0	5	3,000	450
1-5	6	3,600	540
6-10	7	4,200	630
11-14	8	4,800	720
15-17	9	5,400	810
18-20	10	6,000	900

Table 13. Crops and Hectarages Over Innovation Stages

Years Innov. Stages	Hectares			
	Sorghum	Cowpeas	Sesame	Aftermath
0	4	4	1	5
1-5	5	5	1	6
6-10	6	6	1	7
11-14	7	7	1	8
15-17	7	7	2	9
18-20	8	8	2	10

Table 14. Crop Product Prices Over Innovation Stages

Years Innov. Stages	Prices Per Kg.			
	Sorghum	Cowpeas	Sesame	Aftermath/ha.
		So. Sh.		
0 Base	.75	1.50	2.50	120
1-5	.80	1.55	2.55	130
6-10	.85	1.60	2.60	140
11-14	.90	1.65	2.65	150
15-17	1.00	1.70	2.70	160
18-20	1.00	1.70	2.70	160

Table 15. Sorghum: Production, Gross Return, and Changes

Year	Yield Per Ha.	Total Production	Price Per/Kg.	Total Returns	Change In Prod.	Change In Returns
	Kg.	Kg.	So. Sh.		Kg.	So. Sh.
0	353	1412	.75	1059	0	0
1	423	2115	.80	1692	703	633
2	493	2465	.80	1972	1053	913
3	563	2815	.80	2252	1403	1193
4	633	3165	.80	2532	1753	1473
5	703	3515	.80	2812	2103	1753
6	756	4536	.85	3856	3124	2797
7	809	4854	.85	4126	3442	3067
8	862	5172	.85	4396	3760	3337
9	915	5490	.85	4666	4078	3607
10	968	5808	.85	4937	4396	3878
11	1021	6126	.90	5513	4714	4454
12	1074	6444	.90	5800	5032	4741
13	1127	6762	.90	6086	5350	5027
14	1180	7080	.90	6372	5668	5313
15	1227	8589	1.00	8589	7177	7530
16	1274	8918	1.00	8918	7506	7859
17	1321	9247	1.00	9247	7835	8188
18	1351	10808	1.00	10808	9396	9749
19	1381	11048	1.00	11048	9636	9989
20	1411	11288	1.00	11288	9876	10229

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Table 16. Cowpeas: Production, Gross Returns, and Changes

Year	Yield Per Ha.	Total Production	Price Per Kg	Total Returns	Change In Prod.	Change In Returns
	Kg	Kg	So. Sh.		Kg	So. Sh.
0	70	280	1.50	420	0	0
1	84	420	1.55	651	140	231
2	98	490	1.55	759	210	339
3	112	560	1.55	868	280	448
4	126	630	1.55	996	350	556
5	140	700	1.55	1085	420	665
6	150	900	1.60	1440	620	1020
7	160	960	1.60	1536	680	1116
8	170	1020	1.60	1632	740	1212
9	180	1080	1.60	1728	800	1308
10	190	1140	1.60	1824	860	1404
11	200	1400	1.65	2310	1120	1890
12	210	1470	1.65	2425	1190	2005
13	220	1540	1.65	2541	1260	2121
14	230	1610	1.65	2656	1330	2236
15	239	1673	1.70	2844	1393	2424
16	248	1736	1.70	2951	1456	2531
17	257	1799	1.70	3058	1519	2638
18	263	2104	1.70	3577	1824	3157
19	269	2152	1.70	3658	1872	3238
20	275	2200	1.70	3740	1920	3320

Table 17. Sesame: Production, Gross Returns, and Changes

Year	Yield Per Ha.	Total Production	Price Per Kg.	Total Returns	Change In Prod.	Change In Returns
	Kg	Kg	So. Sh.		Kg.	So. Sh.
0	378	378	2.50	945	0	0
1	454	454	2.55	1158	76	213
2	538	538	2.55	1372	160	427
3	606	606	2.55	1545	228	600
4	682	682	2.55	1739	304	794
5	758	750	2.55	1933	380	988
6	815	815	2.60	2119	437	1174
7	872	872	2.60	2267	494	1322
8	929	929	2.60	2415	551	1470
9	986	986	2.60	2564	608	1619
10	1043	1041	2.60	2712	665	1767
11	1100	1100	2.65	2915	722	1970
12	1157	1157	2.65	3066	779	2121
13	1214	1214	2.65	3217	836	2272
14	1267	1267	2.65	3358	889	2413
15	1321	2642	2.70	7133	2264	6188
16	1371	2742	2.70	7403	2364	6458
17	1421	2842	2.70	7673	2464	6728
18	1453	2906	2.70	7846	2528	6901
19	1485	2970	2.70	8019	2592	7074
20	1517	3034	2.70	8192	2656	7247

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Table 18. Aftermath Grazing: Hectares, Gross Returns, Changes

Year	Total Hectares	Price Per Ha	Total Returns	Change In Ha.	Change In Returns
		So. Sh.			So. Sh.
0	5	120	600	-	0
1	6	130	780	1	180
2	6	130	780	-	180
3	6	130	780	-	180
4	6	130	780	-	180
5	6	130	780	-	180
6	7	150	1050	1	450
7	7	150	1050	-	450
8	7	150	1050	-	450
9	7	150	1050	-	450
10	7	150	1050	-	450
11	8	180	1440	1	840
12	8	180	1440	-	840
13	8	180	1440	-	840
14	8	180	1440	-	840
15	9	210	1890	1	1290
16	9	210	1890	-	1290
17	9	210	1890	-	1290
18	10	250	2500	1	1900
19	10	250	2500	-	1900
20	10	250	2500	-	1900

Table 19. Summary: Net Returns Estimates for Composite Crop Farms Over Time

Item	Farm At Year 0	5	10	14	17	20
Cropped Area, Ha. 1/						
Sorghum	4	5	6	7	7	8
Cowpeas 2/	4	5	6	7	7	8
Sesame	1	1	1	1	2	2
Aftermath	5	6	7	8	9	10
Total	5	6	7	8	9	10
Yields						
Sorghum, kg/ha	353	703	968	1180	1321	1411
Cowpeas "	70	140	190	230	257	275
Sesame "	378	758	1043	1267	1421	1517
Aftermath, months	3	3	3	3	3	3
Prices						
Sorghum (Sh./kg)	.75	.80	.85	.90	1.00	1.00
Cowpeas "	1.50	1.55	1.60	1.65	1.70	1.70
Sesame "	2.50	2.55	2.60	2.65	2.70	2.70
Aftermath(Sh./ha)	120	130	150	180	210	250
Value of Production						
Sorghum So. Sh.	1059	2812	4973	6372	9241	11288
Cowpeas "	420	1085	1824	2656	3058	3740
Sesame "	945	1933	2712	3358	7673	8190
Aftermath "	600	780	1050	1440	1890	2500
Total	3024	6610	10523	13826	21862	25720
Costs of Production						
Investment Costs	550 5/	740 6/	900 7/	1200 8/	2000 9/	3000 10/
Operating Costs	200 11/	300 12/	500 13/	750 14/	1050 15/	1450 16/
Total	750	1040	1400	1950	3050	4450
Net Returns	2274	5570	9123	11876	18812	21270
Family Labor 17/	468	468	468	468	468	468
Net Returns/Ha.	455	928	1303	1484	2090	2127
Net Returns/MD	4,9	11.9	19.5	25.4	40.2	45.5

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Table 19 (cont.)

1/ Total Area Cropped.

2/ Double Cropped with sorghum.

3/ Harvest fodder and 3 months a year grazing.

4/ Value of harvested fodder and 3 months a year grazing.

5/ Interest on land value, and hand tools depreciated over 2 years, no salvage value.

6/ Same as 5/ plus some metal hand tools depreciate over 3 years, no salvage value.

7/ Same as 6/ plus oxen power depreciated over 4 years, salvage value as meat. More complex wood and metal walking equipment.

8/ Same as 7/ plus small power motor with walking equipment depreciated over 4 years, limited salvage value. Some beasts of burden depreciated over 5 years, no salvage value.

9/ Same as 8/ plus wagons, simple planting and harvesting equipment and 2 teams of oxen all depreciated over 5 years, limited salvage value.

10/ Same as 9/ plus water and storage facilities, sheds, etc. depreciated over 10 years, limited salvage value.

11/ Seed, minor repairs, interest, etc.

12/ Same plus insecticides, etc.

13/ Same plus feed, higher maintenance costs, etc.

14/ Same plus fuel, part, oil, higher maintenance costs.

15/ Same plus improved seed, limited fertilizer, quality control, etc.

16/ Same plus higher maintenance cost, more fertilizer, marketing cost.

17/ The equivalent of 3 adults for 26 days per month for 6 months. Technology is substituted for labor so no additional labor is needed.

livestock in conjunction with crops here just as every place else in the world. FMETC graduates will need to teach farmers livestock management along with crop management. The Center should provide training in livestock management as forcefully as it does for crops. Economically speaking crops and livestock are often complimentary in the Somali environment.

The FMETC evaluation in livestock management training will depend on the management innovations practiced by livestock owners. In order to project impacts from the FMETC graduates, success must be anticipated.

Composite livestock units to be built and analyzed here require similar information as needed for crop farms. They were done independently so that so that they could be combined (or not combined) in any combination desired. Only cattle, sheep and goats are included here. Camels are left to nonfarm herdsmen. They are important in Somalia agriculture but are not ideal type farm animals.

Prices will change from the base year to year 20. Allowing for conservative changes is better than allowing none at all, Table 20.

It will be useful to know at what rates cattle, sheep and goats substitute for each other. One decision farm managers and FMETC people will need to make concerns the combination of types of animals in the herd. The prices for year zero in Table 20 indicate that sheep may be a more feasible animal than cattle, Table 21.

With animals substituting for each other as in Table 21, a shift toward more sheep and fewer cattle is indicated, Table 22 and Table 23.

Table 20. Livestock Price Changes Over Time

Year	Animals		
	Cattle	Sheep	Goats
		So. Sh./Head	
0	1900	350	500
1	1900	350	500
2	1910	360	510
3	1920	370	520
4	1930	380	530
5	1940	390	540
6	1950	400	550
7	1960	400	560
8	1970	400	570
9	1980	400	580
10	1990	400	590
11	2000	400	600
12	2000	400	600
13	2000	400	600
14	2000	400	600
15	2000	400	600
16	2000	400	600
17	2000	400	600
18	2000	400	600
19	2000	400	600
20	2000	400	600

Table 21. Physical and Economic Relations Among Cattle, Goats and Sheep

Animal	Animal Unit Ratios	Relationships	
		No. Animals/AU	Value/AU
Cattle	1.00	1.0	1900
Goats	.10	10.0	3500
Sheep	.10	10.0	5000

Table 22. Herd Size and Composition, Year 0

Animals	Percent AU's	Composition					
		Size 1		Size 2		Size 3	
		AU's	No.	AU's	No.	AU's	No.
Cattle	92	11.0	11	27.0	27	55.0	55
Goats	5	.6	6	1.5	15	3.0	30
Sheep	3	.3	3	.8	8	1.5	15
Total	100	11.9	20	29.3	50	59.5	100

Table 23. Herd Size and Composition, Year 20

Animals	Percent AU's	Composition					
		Size 1		Size 2		Size 3	
		AU's	No.	AU's	No.	AU's	No.
Cattle	60	7.0	7	17.0	17	33.0	33
Goats	5	.6	6	1.5	15	3.0	30
Sheep	35	4.3	43	10.8	108	23.5	235
Total	100	11.9	56	29.3	140	59.5	298

However, in order to reduce risk and uncertainty, the small farm herd should include some of all three types.

A change in herd composition will not take place immediately. FMETC graduates and others will have to demonstrate the feasibility of such changes. However, the change flow might be as in Table 24.

In year zero the birth rate in all animals is about 34 percent. Of live births about 60 percent live to reach the market at about four or five years of age. With the help of FMETC graduates farmers can change the survival rate dramatically over 20 years as well as lower the age when animals are marketed, Table 25.

Using information provided in the preceding Tables, it is possible to estimate the number of animals that will go to market annually over time. Note that as market age shortens, there are some years in which more than one year's production is marketed, Table 26.

Now the flow of gross returns over time can be estimated for livestock sales, Table 27.

Summaries of physical and economic measures that take place for each herd size and for selected years emphasize the changes that are reasonable in small farm livestock production, Table 28, 29 and 30. Of course, these are only examples. Many combinations of livestock enterprises could develop over 20 years. As with the crop analysis, productivity and economic efficiency rise dramatically as appropriate and simple technology is introduced along the way.

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Table 24. Herd Composition Change By Year

Year	Size 1-11.9 AU's			Size 2-29.3 AU's			Size 3-59.5 AU's		
	Cattle	Goats	Sheep	Cattle	Goats	Sheep	Cattle	Goats	Sheep
	Numbers of Animals								
0	11	6	3	27	15	8	55	30	15
1	11	6	3	26	15	18	53	30	35
2	11	6	3	26	15	18	53	30	35
3	11	6	3	26	15	18	53	30	35
4	11	6	3	26	15	18	53	30	35
5	11	6	3	26	15	18	53	30	35
6	10	6	13	24	15	38	48	30	85
7	10	6	13	25	15	38	48	30	85
8	10	6	13	25	15	38	48	30	85
9	10	6	13	25	15	38	48	30	85
10	10	6	13	25	15	38	48	30	85
11	9	6	23	21	15	68	40	30	165
12	9	6	23	21	15	68	40	30	165
13	9	6	23	21	15	68	40	30	165
14	9	6	23	21	15	68	40	30	165
15	8	6	33	19	15	88	36	30	205
16	8	6	33	19	15	88	36	30	205
17	8	6	33	19	15	88	36	30	205
18	7	6	43	17	15	108	33	30	235
19	7	6	43	17	15	108	33	30	235
20	7	6	43	17	15	108	33	30	235

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Table 25. Changes in Survival Rates and Market Ages

Year	Survival to Market Rates(%)	Market Age (Years)		
		Cattle	Goats	Sheep
0	20	5	5	5
1	30	4	4	4
2	30	4	4	4
3	30	4	4	4
4	30	4	4	4
5	45	3	3	3
6	45	3	3	3
7	45	3	3	3
8	45	3	3	3
9	45	3	3	3
10	45	3	3	3
11	60	3	2	2
12	60	3	2	2
13	60	3	2	2
14	60	3	2	2
15	75	2	1	1
16	75	2	1	1
17	75	2	1	1
18	85	1.5	.5	.5
19	85	1.5	.5	.5
20	85	1.5	.5	.5

Table 26. Flow of Animals Marketed Over Time

Year	Size 1-11.9 AU's			Size 2-29.3 AU's			Size 3-59.5 AU's		
	Cattle	Goats	Sheep	Cattle	Goats	Sheep	Cattle	Goats	Sheep
					Numbers				
0	2	1	1	5	3	2	11	6	3
1	2	1	1	5	3	2	11	6	3
2	2	1	1	5	3	2	11	6	3
3	2	1	1	5	3	2	11	6	3
4	5	3	2	13	7	7	27	18	13
5	3	2	1	8	4	5	16	9	10
6	3	2	1	8	4	5	16	9	10
7	3	2	1	8	4	5	16	9	10
8	7	5	7	19	11	22	38	22	48
9	4	3	6	11	7	17	22	13	38
10	4	3	6	11	7	17	22	13	38
11	4	3	6	11	7	17	22	13	38
12	4	7	20	11	16	58	22	31	137
13	5	4	14	13	9	41	24	18	99
14	5	4	14	13	9	41	24	18	99
15	5	8	39	13	20	107	24	40	253
16	11	4	25	27	11	66	51	22	154
17	6	4	25	14	11	66	27	22	154
18	12	10	62	28	24	158	55	47	354
19	6	5	37	14	13	92	28	25	200
20	6	5	37	14	13	92	28	25	200

Table 27. Gross Returns from Livestock Sales Over Time

Year	Size 1-11.9 AU's			Size 2-29.3 AU's			Size 3-59.5 AU's		
	Cattle	Goats	Sheep	Cattle	Goats	Sheep	Cattle	Goats	Sheep
				(100 So. Sh.)					
0	38.0	3.5	5.0	95.0	10.5	10.0	209.0	21.0	15.0
1	38.0	3.5	5.0	95.0	10.5	10.0	209.0	21.0	15.0
2	38.2	3.6	5.1	95.5	10.8	10.2	210.0	21.6	15.3
3	38.4	3.7	5.2	96.0	11.1	10.4	211.2	22.2	15.6
4	96.5	11.4	10.6	250.9	26.6	37.1	521.1	57.0	69.9
5	58.2	7.8	5.4	155.2	15.6	21.6	310.4	35.1	54.0
6	58.5	8.0	5.5	156.0	16.0	27.5	312.0	56.0	55.0
7	58.8	8.2	5.6	156.8	16.5	28.0	313.6	36.9	56.0
8	137.9	20.0	39.9	374.3	44.0	125.4	748.6	88.0	273.6
9	79.2	12.0	34.8	217.8	28.0	98.6	435.6	52.0	220.4
10	79.6	12.0	35.4	218.9	28.0	100.3	437.8	52.0	224.2
11	80.0	12.0	36.0	220.0	28.0	102.0	440.0	52.0	228.0
12	80.0	28.0	120.0	220.0	64.0	348.0	440.0	124.0	822.0
13	100.0	16.0	84.0	260.0	36.0	246.0	480.0	72.0	594.0
14	100.0	16.0	84.0	260.0	36.0	246.0	480.0	72.0	594.0
15	100.0	32.0	234.0	260.0	80.0	642.0	480.0	160.0	918.0
16	220.0	16.0	150.0	260.0	44.0	396.0	1021.0	88.0	924.0
17	120.0	16.0	150.0	280.0	44.0	396.0	540.0	88.0	924.0
18	240.0	40.0	372.0	560.0	96.0	948.0	1100.0	188.0	2124.0
19	120.0	20.0	222.0	280.0	52.0	553.0	560.0	100.0	1524.0
20	120.0	20.0	222.0	280.0	52.0	552.0	560.0	100.0	1524.0

Table 28. Summary: Composite Livestock Herd, Size 1 (11.9 AU's)

Item	At Year: 0	5	10	14	17	20
				Numbers		
Herd Females						
Cattle	11	11	10	9	8	7
Goats	6	6	6	6	6	6
Sheep	3	3	13	23	33	43
Total	20	20	29	38	47	56
Animals Marketed						
Cattle	2	3	4	5	6	6
Goats	1	2	3	4	4	4
Sheep	11	1	6	14	25	37
Total	14	6	13	23	35	48
Prices Per Head				So. Sh.		
Cattle	1900	1940	1990	2000	2000	2000
Goats	350	390	400	400	400	400
Sheep	500	540	590	600	600	600
Value of Products						
Cattle	3800	5820	7960	10000	12000	12000
Goats	350	780	1200	1600	1600	2000
Sheep	500	540	3540	8400	15000	22200
Total	4650	7140	12700	20000	28600	36200
Costs of Production				So. Sh.		
Investment 1/	2040	2110	2500	2850	3180	3520
Operating 2/	500	1000	1500	2000	2500	3000
Total	2540	3110	4000	4850	5680	6520
Net Returns	2110	4030	8700	15150	22920	29680
Family Labor, Days 3/	1095	1095	1095	1095	1095	1095
Net Returns/AU	177	339	731	1273	1926	2494
Net Returns/MD	1.9	3.7	8.0	13.8	20.9	27.1

1/ Value of females in the herd divided by 2, depreciated over 6 years, additional facilities depreciated as technology changes, and 15 percent interest on the investment.

2/ Includes aftermath grazing, other feed, control equipment, medicines, pesticides, etc.

3/ Equivalent of 3 adults for 365 days a year.

Table 29. Summary: Composite Livestock Herd, Size 2(29.3 AU's)

Item	At Year: 0	5	10	14	17	20
			Numbers			
Herd Females						
Cattle	27	26	24	21	19	17
Goats	15	15	15	15	15	15
Sheep	8	18	38	68	88	108
Total	50	59	77	104	122	140
Animals Marketed			Numbers			
Cattle	5	8	11	13	14	15
Goats	3	4	7	9	11	13
Sheep	2	5	17	41	66	92
Prices			So. Sh./Head			
Cattle	1900	1940	1990	2000	2000	2000
Goats	450	390	400	400	400	400
Sheep	500	540	590	600	600	600
Value of Products			So. Sh.			
Cattle	9500	15520	21890	26000	28000	28000
Goats	1050	1560	2800	3600	4400	5200
Sheep	1000	2700	10030	24600	39600	55200
Total	11500	19780	34720	54200	72000	88400
Costs of Production			So. Sh.			
Investment 1/	4610	1500	6380	7400	8070	8730
Operating Costs 2/	1600	3000	3550	4000	6500	7000
Total	6210	8500	9900	11400	14570	15730
			So. Sh.			
Net Returns	5340	11280	24820	42800	57430	72670
Family Labor 3/	1460	1460	1460	1460	1460	1460
Net Returns/AH	183	385	847	1460	1960	2480
Net Returns/MD	3.7	7.7	17.7	29.3	39.3	49.8

1/ See notes for previous Table.

2/ See notes for previous Table.

3/ Equivalent of 4 adults for 365 days a year with technology substitution for labor as development takes place.

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Table 30. Summary: Composite Livestock Herd, Size 3(59.5 AU's)

Item	At Year 0	5	10	14	17	20
			Numbers			
Herd Females						
Cattle	55	53	48	40	36	33
Goats	30	30	30	30	30	30
Sheep	15	35	85	165	205	235
Total	100	118	163	235	271	298
Animals Marketed			Numbers			
Cattle	11	16	22	24	27	28
Goats	6	9	13	18	22	25
Sheep	3	10	38	99	154	200
Total	20	35	73	141	203	253
Prices			So. Sh./Head			
Cattle	1900	1940	1990	2000	2000	2000
Goats	350	390	400	400	400	400
Sheep	500	540	590	600	600	600
Value of Products			So. Sh.			
Cattle	20900	31040	43780	48000	54000	56000
Goats	2100	3510	5200	7200	8800	10000
Sheep	1500	5400	22420	59400	90000	120000
Total	24500	39950	71400	114600	152800	18600
Costs of Production			So. Sh.			
Investment	10208	11118	13139	15917	17250	18250
Operating[2/]	2500	4500	6600	7500	8200	9000
Total	12708	15618	19739	23417	25450	27250
Net Returns	11792	24332	51661	91183	124443	158750
Family Labor[3/]	2190	2190	2190	2190	2190	2190
Net Returns/AU	198	409	868	1532	2140	2668
Net Returns/MD	5.4	11.1	23.6	41.6	58.2	72.5

1/ See previous Table.

2/ See previous Table.

3/ Equivalent of 6 adults for 365 days a year with technology substituting for labor as development takes place.

Economic Summary

The micro-economic analysis has been emphasized in this report because adequate macro-economic measures have been estimated by others. However, if an internal rate of return attributable to the influence of a successful FMETC program is desired, the flow of changes in the gross returns Tables multiplied by the number of farms and livestock operations can be estimated. Gross returns should be used because even the changes in costs of production from year 0 stimulate the economy.

Program costs for the FMETC can be spread over 20 years as has been done in other reports. Twenty years has been used because it is felt that a full generation will be needed to bring small farm and livestock managers to the verge of modern mechanized technology. It will take Somali government institutions, education, and small farm and market business managers 20 years to adjust so necessary supports for modern mechanized small-family-sized operations can develop into viable commercial units.

Most of the crop and livestock products discussed in this report are exportable, so increasing production of crops and livestock will have a beneficial effect upon the foreign exchange balance. Fear of depressed prices in the domestic market will, of course, depend upon government action, but exportable products should not feel strongly a let down in domestic demand if it should occur.

Down the road a way possibly near the end of the 20 year period, marketing improvements need to be introduced that will give family

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farm managers an incentive to improve quality and productivity beyond the suggested changes in this report. Product grading, price differentiation by grade, price by weight for livestock, reduction of marketing waste in crops and livestock, refrigeration, motor transportation, improved country roads, market new information, etc., etc. are all possibilities. The FMETC can initiate these programs at appropriate times in the future.

Conclusions

The important conclusions after this brief study period are:

1. The natural resource potential for meeting Somalia's agricultural goals is here. Both crops and livestock production could increase several times with only small capital investment.

2. The level of human capital is a limiting factor to achieve self sufficiency, but the material to eliminate this shortage is in abundance among the Somali people.

3. Supporting government institutions are limiting at the present time, but again, Somalis with vision are beginning to remove these limitations.

4. An FMETC is a necessity in order to transfer information, management skills, and technology to the small farm and herd sectors in agriculture.

5. There is considerable low cost technology available to increase dramatically agricultural productivity in Somalia.

6. Research should be applied and demonstration types. Also, some adaptation tests need to be made for imported or Somali developed technology.

ANNEX 12

FINANCIAL ANNEXES

Table No.	Title
1	A.I.D. Detailed Budget
2	Project Cost Summary
3	NES
4	NES Bonka
5	NES Jannale
6	FMETC
7	FMETC Farm
8	PMU
9	FMAS
10	FMAS - DSF
11	Ag Secondary School
12	Central Statistics
13	Project Financing IDA
14	Project Financing ADF
15	Project Financing EEC
16	GSDR Cash Flow

AGRICULTURAL DELIVERY SYSTEMS
DETAILED AID FINANCING
(000 Dollars)

ITEM	UNIT COST	Year 1		Year 2		Year 3		Year 4		Year 5		TOTAL	
TECHNICAL ASSISTANCE													
NES													
Ag. Extension	80	.5	40	1	80	1	80	1	80	1	80	4.5	360
Plant Protection	80	.5	40	1	80	1	80	1	80	1	80	4.5	360
Farm Systems	80	.5	40	1	80	1	80	1	80	1	80	4.5	360
Communication	80	.5	40	1	80	1	80	1	80	1	80	4.5	360
FMETC													
Ag. Training	80	1	80	.5	40	.5	40	.5	40	.5	40	3	240
Agronomist - Dry Lands	80	-	-	.5	40	.5	40	.5	40	.5	40	2	160
Agronomist - Irrigation	80	-	-	.5	40	1	80	1	80	1	80	3.5	280
Ag. Engineer	80	-	-	.5	40	1	80	1	80	1	80	3.5	280
Master Mechanic	80	-	-	.5	40	1	80	1	80	1	80	3.5	280
Farm Management	80	-	-	.5	40	1	80	1	80	1	80	3.5	280
Livestock	80	-	-	.5	40	1	80	1	80	1	80	3.5	280
Subtotal T.A.		3	240	7.5	600	10	800	10	800	10	800	40.5	3240
PARTICIPANT TRAINING													
NES													
Ag. Extension	15	-	-	1	15	1	15	1	15	1	15	4	60
Agronomy	15	-	-	1	15	1	15	1	15	1	15	4	60
Plant Protection	15	-	-	1	15	1	15	1	15	1	15	4	60
Communications	15	-	-	1	15	1	15	1	15	1	15	4	60
FMETC													
A. Education	15	-	-	1	15	1	15	1	15	1	15	4	60
Agronomy	15	-	-	-	-	2	30	4	60	2	30	8	120
Ag. Engineering	15	-	-	-	-	1	15	2	30	1	15	4	60
Ag. Machinery	15	-	-	-	-	1	15	2	30	1	15	4	60
Farm Management	15	-	-	-	-	1	15	2	30	1	15	4	60
STUDY TRIPS (NES)													
Field Visits (MOA Sr. Staff)	15	.25	4	.5	7	-	-	-	-	-	-	.75	11
Study Trips (REO)	15	-	-	.5	7	.25	4	.25	4	-	-	1	15
Study Trips (DFO)	15	-	-	4	60	4	60	4	60	4	60	16	240
Subtotal Training		.25	4	10	149	14.25	214	19.25	289	14	210	57.75	866

	UNIT COST	Year 1		Year 2		Year 3		Year 4		Year 5		TOTAL
COMMODITIES												
NES												
Headquarters												
4-Wheel Drive	14.6	3	43.8	1	14.6	-	-	-	-	3	43.8	102.2
Motorbikes	.9	2	1.8	-	-	-	-	-	-	2	1.8	3.6
Furniture & Equip.-Office	-	-	-	-	53	-	-	-	-	-	-	53
Furniture & Equip.-Houses	-	-	-	-	44	-	12	-	12	-	-	68
Audio Visual & Printing Eqmt	-	-	-	-	16	-	16	-	16	-	-	48
Regional												
4-Wheel Drive	14.6	2	29.2	-	-	-	-	1	14.6	3	43.8	87.6
Motorbikes	.9	9	8.1	-	-	-	-	-	-	20	18	26.1
Bicycles	.1	30	3	39	3.9	16	1.6	68	6.8	157	15.7	31.0
Furniture & Equip.-Office	-	-	-	-	13	-	-	-	6.5	-	-	19.5
Furniture & Equip.-Houses	-	-	37	-	3	-	27	-	15.7	-	27	109.7
Audio Visual Equipment	-	-	8	-	8	-	8	-	8	-	8	40
Bonka ETC	-	-	60	-	46	-	4.7	-	4.7	-	4.7	120.1
Jenale ETC	-	-	40	-	62	-	8	-	8	-	8	126
FMETC												
4-Wheel Drive	14.6	-	-	1	14.6	1	14.6	-	-	-	-	29.2
2-Wheel Drive	7	-	-	1	7	-	-	-	-	-	-	7
Motorbides	.9	-	-	2	1.8	-	-	-	-	-	-	1.8
Bus - 27 Seats	30	-	-	1	30	-	-	-	-	-	-	30
Truck - 7 Ton	28	-	-	1	28	-	-	-	-	-	-	28
Workshop Training		-	-	-	60	-	-	-	-	-	-	60
Draft Animals	.2	-	-	-	-	5	1	-	-	-	-	1
Library		-	-	-	15	-	-	-	-	-	-	15
Machinery & Equip.-School Farm	-	-	-	-	89	-	-	-	-	-	-	89
Irrigation Machinery	-	-	-	-	74	-	-	-	-	-	-	74
Furniture & Equip.-House	-	-	-	-	84	-	-	-	-	-	-	84
Furniture & Equip.-FMETC	-	-	-	-	51	-	-	-	-	-	-	51
Furniture & Equip.-Office	-	-	-	-	53	-	-	-	-	-	-	53
Furniture & Equip.-Shop	-	-	-	-	13	-	-	-	-	-	-	13
Subtotal Commodities			230.9		783.9		92.9		92.3		170.8	1370.8
Research			111		-		-		-		-	111
TOTAL Base Costs			585.9		1532.9		1112.9		1176.3		1180.8	5587.8
Contingencies			13		78		154		100.8		108.4	455.2
Inflation			47		251		347		458		606	1709
TOTAL COST			645.9		1861.9		1613.9		1735.1		1895.2	7752

TABLE 1 2 of 2

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Table 2. Project Cost Summary

Project Component	Local Currency	Foreign Exchange	Total	Local Currency	Foreign Exchange	Total	Foreign Exchange
	----So. Sh. million----			------US$ million------			%
Project Management	7.1	11.1	18.2	1.1	1.8	2.9	68
Consultancy Services: Procurement and Preparation Phase II	-	3.2	3.2	-	0.5	0.5	100
Farm Management and Extension Training Center	11.4	23.9	35.3	1.8	3.8	5.6	66
National Extension Service	27.5	27.5	55.0	4.3	4.4	8.7	50
Farm Management Advisory Service (excluding DSF)	1.7	6.9	8.6	0.3	1.1	1.4	79
Demonstration State Farm	7.2	12.8	20.0	1.1	2.0	3.1	65
Research	-	0.7	0.7	-	0.1	0.1	100
Central Statistical Department	1.3	5.4	6.7	0.2	0.9	1.1	82
Consultancy Services for Civil Works	-	1.2	1.2	-	0.2	0.2	100
Agricultural Secondary School	0.3	7.8	8.1	0.1	1.2	1.3	92
Total Base Costs	56.5	100.5	157.0	8.9	16.0	24.9	64
Physical Contingencies	2.4	4.4	6.8	0.4	0.7	1.1	64
Price Contingencies	15.2	25.0	40.2	2.4	4.0	6.4	64
Total Cost	74.1	129.9	204.0	11.7	20.7	32.4	64
Type of Expenditure							
Vehicles and Equipment	1.9	15.4	17.3	0.3	2.5	2.8	89
Civil Works	17.7	16.8	34.5	2.8	2.7	5.5	49
Technical Assistance	-	47.4	47.4	-	7.5	7.5	100
Training Abroad	-	8.8	8.8	-	1.4	1.4	100
Local Salaries and Wages	32.0	-	32.0	5.0	-	5.0	-
Operating and Maintenance Costs	4.9	12.1	17.0	0.8	1.9	2.7	70
Total Base Cost	56.5	100.5	157.0	8.9	16.0	24.9	64
Physical Contingencies	2.4	4.4	6.8	0.4	0.7	1.1	64
Price Contingencies	15.2	25.0	40.2	2.4	4.0	6.4	64
Total Cost	74.1	129.9	204.0	11.7	20.7	32.4	64

TABLE 3

[illegible]

[illegible]

[illegible]

	Unit Costs	Year 1		Year 2		Year 3		Year 4		Year 5		Total Costs	Foreign Exchange %	Foreign Exchange Total
Capital Costs														
Vehicles and Equipment														
Headquarters Level														
4-Wheel Drive	92,000	3	276,000	1	92,000	-	-	-	-	3	276,000	644,000	90	579,600
Motorbikes	5,600	2	11,200	-	-	-	-	-	-	2	11,200	22,400	90	20,160
Furniture and Equipment - Offices	-	-	-	Sum	334,125	-	-	-	-	-	-	334,125	90	300,712
Furniture and Equipment - Houses	-	-	-	Sum	275,000	Sum	70,000	Sum	70,000	-	-	425,000	90	383,250
Communication and Printing Equipment 1/	-	-	-	Sum	100,000	Sum	100,000	Sum	100,000	-	-	300,000	90	270,000
Regional Level														
4-Wheel Drive	92,000	2	184,000	-	-	-	-	1	92,000	3	276,000	552,000	90	496,800
Motorbikes	5,600	9	50,400	-	-	-	-	-	-	20	112,000	162,400	90	146,160
Bicycles	1,000	20	20,000	30	30,000	16	16,000	60	60,000	137	137,000	310,200	90	279,180
Furniture and Equipment - Offices	-	-	-	Sum	81,000	-	-	Sum	41,000	-	-	122,000	90	110,000
Furniture and Equipment - Houses	-	Sum	262,000	Sum	24,000	Sum	160,000	Sum	99,000	Sum	171,630	701,000	90	631,300
Communications Equipment	-	Sum	50,000	Sum	50,000	Sum	50,000	Sum	50,000	Sum	50,000	250,000	90	225,000
Bonka ETC 2/	-	-	-	Sum	379,000	Sum	293,000	Sum	20,300	Sum	20,000	712,000	89	640,000
Janaale ETC 2/	-	-	-	Sum	337,000	Sum	393,200	Sum	20,200	Sum	20,200	770,000	81	606,100
Sub-Total			863,600		1,631,125		1,096,000		660,000		1,113,200	5,311,925	88	4,699,912
Civil Works														
Headquarters Level														
Housing														
Type A	234,000	3	702,000	1	234,000	-	-	-	-	-	-	936,000	45	421,200
Type B	94,500	7	661,500	2	189,000	-	-	-	-	-	-	850,500	45	382,725
Type C	60,800	-	-	1	60,800	6	364,800	-	-	-	-	425,600	45	191,520
Type D	3,000	4	12,000	2	6,000	9	27,000	-	-	-	-	45,000	20	9,000
Offices	-			675 m^2	911,250	-	-	-	-	-	-	911,250	45	410,062
Photo Lab	-			50 m^2	67,500	-	-	-	-	-	-	67,500	45	30,375
Printing Room	-			100 m^2	135,000	-	-	-	-	-	-	135,000	45	60,750
Water Catchment, Storage, Reticulation	-			Sum	315,000	Sum	315,000	-	-	-	-	630,000	45	283,500
Regional Level														
Housing														
Type B	94,500	-	-	6	567,000	-	-	3	283,500	-	-	850,500	45	382,725
Type C	60,800	-	-	9	547,200	13	790,400	-	-	6	364,800	1,702,400	45	766,080
Type D	3,000	31	93,000	39	117,000	17	51,000	69	207,000	163	489,000	957,000	45	430,650
Offices	-	-	-	200 m^2	270,000	100 m^2	135,000	-	-	-	-	405,000	45	182,250
Bonka ETC	-	-	-	Sum	1,798,000	Sum	315,000	-	-	-	-	2,113,000	43	917,150
Janaale ETC	-	-	-	Sum	1,873,600	Sum	315,000	-	-	-	-	2,188,600	45	973,630
Water Catchment, Storage, Reticulation	-	-	-	Sum	315,000	Sum	315,000	-	-	-	-	630,000	45	283,500
Sub-Total			1,468,500		7,606,350		2,628,200		490,500		853,800	12,847,350	45	5,725,020
Total Capital Costs			2,332,100		9,237,475		3,724,200		1,150,500		1,967,000	18,159,275	57	10,424,932
Operating Costs														
Salaries and Wages 3/														
Headquarters Level														
Director NES */	504,000	0.5	252,000	1	504,000	1	504,000	1	504,000	1	504,000	2,268,000	100	2,268,000
Deputy Director 1 (Grade A)	59,000	0.5	29,500	1	59,000	1	59,000	1	59,000	1	59,000	265,500	72	191,160
Deputy Director 2 (Grade A)	59,000	0.5	29,500	1	59,000	1	59,000	1	59,000	1	59,000	265,500	72	191,160
Plant Protection Specialist */	504,000	0.5	252,000	1	504,000	1	504,000	1	504,000	1	504,000	2,268,000	100	2,268,000
Deputy Plant Protection Specialist 1 (Gr.A)	59,000	0.5	29,500	1	59,000	1	59,000	1	59,000	1	59,000	265,500	72	191,160
Deputy Plant Protection Specialist 2 (Gr.A)	59,000	0.5	29,500	1	59,000	1	59,000	1	59,000	1	59,000	265,500	72	191,160
Farming System Specialist */	504,000	0.5	252,000	1	504,000	1	504,000	1	504,000	1	504,000	2,268,000	100	2,268,000
Deputy Farming System Specialist 1 (Grade A)	59,000	0.5	29,500	1	59,000	1	59,000	1	59,000	1	59,000	265,500	72	191,160
Deputy Farming System Specialist 2 (Grade A)	59,000	0.5	29,500	1	59,000	1	59,000	1	59,000	1	59,000	265,500	72	191,160
Communications Specialist */	504,000	0.5	252,000	1	504,000	1	504,000	1	504,000	1	504,000	2,268,000	100	2,268,000
Deputy Communications Specialist 1 (Grade A)	59,000	0.5	29,500	1	59,000	1	59,000	1	59,000	1	59,000	265,500	72	191,160
Deputy Communications Specialist 2 (Grade A)	59,000	0.5	29,500	1	59,000	1	59,000	1	59,000	1	59,000	265,500	72	191,160
Secretary	9,000	0.5	4,500	1	9,000	1	9,000	1	9,000	1	9,000	40,500	-	-
Clerk Typist	8,000	1	8,000	3	24,000	4	32,000	4	32,000	4	32,000	128,000	-	-
Training Program Officer (Grade F)	9,000	-	-	1	9,000	1	9,000	1	9,000	1	9,000	36,000	-	-
Driver	9,000	2	18,000	4	36,000	4	36,000	4	36,000	4	36,000	162,000	-	-
Messenger	6,000	0.5	3,000	1	6,000	1	6,000	1	6,000	1	6,000	27,000	-	-
Printing Unit														
Editor	10,000	-	-	1	10,000	1	10,000	1	10,000	1	10,000	40,000	-	-
Printer	9,000	-	-	1	9,000	1	9,000	1	9,000	1	9,000	36,000	-	-
Compositor	9,000	-	-	1	9,000	1	9,000	1	9,000	1	9,000	36,000	-	-
Artist Illustrator	9,000	-	-	1	9,000	1	9,000	1	9,000	1	9,000	36,000	-	-
Translator	18,000	-	-	1	18,000	1	18,000	1	18,000	1	18,000	72,000	-	-
Clerk Typist	8,000	-	-	2	16,000	2	16,000	2	16,000	2	16,000	64,000	-	-
Permanent Labor	6,000	-	-	2	12,000	2	12,000	2	12,000	2	12,000	48,000	-	-
Audio-Visual Unit														
Photographer	8,000	-	-	1	8,000	1	8,000	1	8,000	1	8,000	32,000	-	-
Lab. Technician	8,000	-	-	1	8,000	1	8,000	1	8,000	1	8,000	32,000	-	-
Equipment Operator	8,000	-	-	1	8,000	1	8,000	1	8,000	1	8,000	32,000	-	-
Clerk Typist	8,000	-	-	2	16,000	2	16,000	2	16,000	2	16,000	64,000	-	-
Permanent Labor	6,000	-	-	2	12,000	2	12,000	2	12,000	2	12,000	48,000	-	-
Regional Level														
Regional Extension Officer (Grade A)	30,000	2	60,000	4	120,000	4	120,000	4	120,000	4	120,000	540,000	-	-
Regional Farming System Specialist (Grade A)	30,000	2	60,000	4	120,000	4	120,000	4	120,000	4	120,000	540,000	-	-
Regional Plant Protection Specialist (Gr.A)	30,000	2	60,000	4	120,000	4	120,000	4	120,000	4	120,000	540,000	-	-
District Extension Officer	18,000	9	162,000	16	288,000	32	576,000	42	756,000	52	936,000	2,718,000	-	-
Field Extension Agent	16,000	30	480,000	70	1,120,000	90	1,440,000	130	2,080,000	310	4,960,000	10,080,000	-	-
Clerk Typists	8,000	1	8,000	2	16,000	3	24,000	5	40,000	11	88,000	176,000	-	-
Field Visits - NOA	95,000	0.25	23,750	0.5	47,500	-	-	-	-	-	-	71,250	100	71,250
Study Trips - Regional Extension Officers	95,000	-	-	0.5	47,500	0.25	23,750	0.25	23,750	-	-	95,000	100	95,000
Study Trips - DEOs (one month)	95,000	-	-	-	328,000	-	328,000	-	328,000	-	328,000	1,312,000	100	1,312,000
Bonka - ETC	-	-	-	Sum	228,000	Sum	228,000	Sum	228,000	Sum	228,000	912,000	-	-
Janaale - ETC	-	-	-	Sum	228,000	Sum	228,000	Sum	228,000	Sum	228,000	912,000	-	-
Sub-Total			1,997,250		5,448,000		6,300,750		7,164,750		9,913,000	30,823,750	40	12,270,250
Other Operating Costs														
Headquarters Level														
4-Wheel Drive POL	40,000	3	120,000	4	160,000	4	160,000	4	160,000	4	160,000	760,000	90	684,000
Motorbike POL	9,000	2	18,000	2	18,000	2	18,000	2	18,000	2	18,000	90,000	90	81,000
Utilities	-	-	-	Sum	50,000	Sum	50,000	Sum	50,000	Sum	50,000	200,000	90	180,000
Office Supplies	-	Sum	20,000	Sum	50,000	Sum	50,000	Sum	50,000	Sum	50,000	220,000	90	198,000
Photolab and Printing Supplies	-	-	-	Sum	50,000	Sum	100,000	Sum	100,000	Sum	100,000	350,000	90	315,000
Rent for Housing	-	Sum	300,000	Sum	150,000	-	-	-	-	-	-	450,000	-	-
Building Maintenance	-	Sum	28,000	Sum	50,000	Sum	65,000	Sum	65,000	Sum	65,000	273,000	45	122,850
Miscellaneous Items	-	Sum	50,000	Sum	50,000	Sum	50,000	Sum	50,000	Sum	50,000	250,000	50	125,000
Regional Level														
4-Wheel Drive POL	40,000	2	80,000	2	80,000	2	80,000	3	120,000	4	160,000	520,000	90	468,000
Motorbike POL	9,000	8	72,000	16	144,000	32	288,000	42	378,000	52	468,000	1,350,000	90	1,215,000
Bicycles	100	30	3,000	70	7,000	90	9,000	130	13,000	310	31,000	63,000	90	56,700
Office Supplies	-	Sum	10,000	Sum	10,000	Sum	20,000	Sum	20,000	Sum	30,000	90,000	90	81,000
Utilities	-	Sum	20,000	Sum	20,000	Sum	20,000	Sum	30,000	Sum	30,000	120,000	90	108,000
Building Maintenance	-	Sum	30,000	Sum	32,000	Sum	52,000	Sum	62,000	Sum	80,000	256,000	45	115,200
Bonka - ETC	-	-	-	Sum	35,000	Sum	218,000	Sum	218,000	Sum	218,000	689,000	81	558,090
Janaale - ETC	-	-	-	Sum	35,000	Sum	218,000	Sum	218,000	Sum	218,000	689,000	81	558,090
Miscellaneous	-	Sum	10,000	Sum	10,000	Sum	10,000	Sum	10,000	Sum	10,000	50,000	50	25,000
Sub-Total			761,000		979,000		1,438,000		1,566,000		1,738,000	6,410,000	75	4,837,000
Total Operating Costs			2,758,250		6,387,000		7,408,750		8,730,750		11,651,000	36,933,750	46	17,121,250
Total Base Costs			5,090,350		15,624,475		11,132,950		9,877,250		13,618,000	55,293,025	50	27,526,182

1/ Including printing press, 2 cameras, 2 film projectors super 8 mm, 2 slide projectors, a movie camera and a film projector 16 mm.
2/ Details in Implementation Volume: Annex 4, Appendices 1, 2.
3/ Including per diem and field allowances for staff and training costs for those sent abroad for training.
*/ Internationally Recruited.

1/10/79
RB:ak

TABLE 4

SOMALIA

AGRICULTURAL EXTENSION AND FARM MANAGEMENT TRAINING PROJECT

NATIONAL EXTENSION SERVICE
BOMBA - EXTENSION TRAINING CENTER

	Unit Cost	Year 1		Year 2		Year 3		Year 4		Year 5		Total Costs	Foreign Exchange %	Foreign Exchange Total
Capital Costs														
Vehicles and Equipment														
4-Wheel Drive Pickup	92,000	-	-	-	-	1	92,000	-	-	-	-	92,000	90	82,800
Tractor 60-70 hp	94,000	-	-	-	-	1	94,000	-	-	-	-	94,000	90	84,600
Trailer	25,000	-	-	-	-	1	25,000	-	-	-	-	25,000	90	22,500
Farm Implements	-	-	-	-	-	Sum	20,000	-	-	-	-	20,000	90	18,000
Draft Animals	1,200	-	-	-	-	10	12,000	-	-	-	-	12,000	-	-
Workshop Equipment	-	-	-	Sum	189,000	-	-	-	-	-	-	189,000	90	170,100
Furniture and Equipment - Classrooms	-	-	-	Sum	63,000	-	-	-	-	-	-	63,000	90	56,700
Furniture and Equipment - Offices	-	-	-	Sum	32,000	-	-	-	-	-	-	32,000	90	28,800
Furniture and Equipment - Library	-	-	-	Sum	32,000	-	-	-	-	-	-	32,000	90	28,800
Communications Equipment	-	-	-	Sum	63,000	-	-	-	-	-	-	63,000	90	56,700
Miscellaneous	-	-	-	-	-	Sum	30,000	Sum	30,000	Sum	30,000	110,000	90	99,000
Sub-Total					379,000		293,000		30,000		30,000	732,000	89	[illegible]
Civil Works														
Housing														
Type B	94,500	-	-	1	94,500	-	-	-	-	-	-	94,500	45	42,500
Type C	60,800	-	-	5	304,000	-	-	-	-	-	-	304,000	45	136,800
Type D	3,000	-	-	15	45,000	-	-	-	-	-	-	45,000	20	[illegible]
Rehabilitation of Existing Facilities	-	-	-	Sum	300,000	-	-	-	-	-	-	300,000	45	135,000
Classrooms	1,350	-	-	170 m^2	229,500	-	-	-	-	-	-	229,500		
Well and Piping	-	-	-	Sum	360,000	-	-	-	-	-	-	360,000	45	162,000
Open Shed	500	-	-	100 m^2	50,000	-	-	-	-	-	-	50,000	45	22,500
Animal Shed	1,000	-	-	100 m^2	100,000	-	-	-	-	-	-	100,000	45	45,000
Water Catchment, Storage, Reticulation	-	-	-	Sum	315,000	Sum	315,000	-	-	-	-	630,000	45	283,500
Sub-Total					1,798,000		315,000					2,113,000	43	917,100
Total Capital Costs					2,177,000		608,000		30,000		30,000	2,845,000	55	1,565,100
Operating Costs														
Salaries and Wages														
Principal (Grade A)	30,000	-	-	1	30,000	1	30,000	1	30,000	1	30,000	120,000	-	-
Farming System Specialist	18,000	-	-	1	18,000	1	18,000	1	18,000	1	18,000	72,000	-	-
Plant Protection Specialist	18,000	-	-	1	18,000	1	18,000	1	18,000	1	18,000	72,000	-	-
Ag. Machinery and Implements Specialist	18,000	-	-	1	18,000	1	18,000	1	18,000	1	18,000	72,000	-	-
Farm Manager (ETC Farm)	18,000	-	-	1	18,000	1	18,000	1	18,000	1	18,000	72,000	-	-
Permanent Labor	6,000	-	-	5	30,000	5	30,000	5	30,000	5	30,000	120,000	-	-
Cleaning Staff	6,000	-	-	2	12,000	2	12,000	2	12,000	2	12,000	48,000	-	-
Cooking Staff	6,000	-	-	4	24,000	4	24,000	4	24,000	4	24,000	96,000	-	-
Watchman	6,000	-	-	2	12,000	2	12,000	2	12,000	2	12,000	48,000	-	-
Messenger	6,000	-	-	1	6,000	1	6,000	1	6,000	1	6,000	24,000	-	-
Clerk/Typist	8,000	-	-	1	8,000	1	8,000	1	8,000	1	8,000	32,000	-	-
Workshop Manager	18,000	-	-	1	18,000	1	18,000	1	18,000	1	18,000	72,000	-	-
Mechanic	16,000	-	-	1	16,000	1	16,000	1	16,000	1	16,000	64,000	-	-
Sub-Total					228,000		228,000		228,000		228,000	912,000		
Other Operating Costs														
4-Wheel Drive - POL	40,000	-	-	-	-	1	40,000	1	40,000	1	40,000	120,000	90	108,000
Tractor - POL	20,000	-	-	-	-	1	20,000	1	20,000	1	20,000	60,000	90	54,000
Animal feed	-	-	-	-	-	Sum	3,000	Sum	3,000	Sum	3,000	9,000		
Office/Teaching Supplies	-	-	-	Sum	5,000	Sum	5,000	Sum	5,000	Sum	5,000	20,000	90	18,000
Utilities	-	-	-	-	-	Sum	110,000	Sum	110,000	Sum	110,000	330,000	90	297,000
Miscellaneous	-	-	-	-	-	Sum	10,000	Sum	10,000	Sum	10,000	30,000	90	27,000
Building Maintenance	-	-	-	Sum	30,000	Sum	30,000	Sum	30,000	Sum	30,000	120,000	45	[illegible]
Sub-Total					35,000		218,000		218,000		218,000	689,000	81	558,000
Total Operating Costs					263,000		446,000		446,000		446,000	1,601,000	35	[illegible]
Total Base Costs					2,440,000		1,054,000		476,000		476,000	[illegible]	48	[illegible]

1/15/79
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TABLE 5

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SOMALIA

AGRICULTURAL EXTENSION AND FARM MANAGEMENT TRAINING PROJECT

NATIONAL EXTENSION SERVICE
JAMBALE - EXTENSION TRAINING CENTER

	Unit Cost	Year 1		Year 2		Year 3		Year 4		Year 5		Total Costs	Foreign Exchange %	Foreign Exchange Costs
Capital Costs														
Vehicles and Equipment														
4-Wheel Drive Pickup	92,000	-	-	-	-	1	92,000	-	-	-	-	92,000	90	82,800
Tractor 65-70 hp	94,000	-	-	-	-	1	94,000	-	-	-	-	94,000	90	84,600
Trailer	25,000	-	-	-	-	1	25,000	-	-	-	-	25,000	90	22,500
Farm Implements	-	-	-	-	-	Sum	20,000	-	-	-	-	20,000	90	18,000
Generator 15 kW	65,000	-	-	1	65,000	-	-	-	-	-	-	65,000	90	58,500
Draft Animals	1,200	-	-	-	-	10	12,000	-	-	-	-	12,000	-	-
Workshop Equipment	-	-	-	-	-	Sum	100,000	-	-	-	-	100,000	90	90,000
Furniture and Equipment - Classrooms	-	-	-	Sum	65,000	-	-	-	-	-	-	65,000	90	58,500
Furniture and Equipment - Offices	-	-	-	Sum	32,000	-	-	-	-	-	-	32,000	90	28,800
Furniture and Equipment - Library	-	-	-	Sum	32,000	-	-	-	-	-	-	32,000	90	28,800
Communications Equipment	-	-	-	Sum	63,000	-	-	-	-	-	-	63,000	90	56,700
Miscellaneous	-	-	-	-	-	Sum	50,000	Sum	30,000	Sum	30,000	150,000	50	75,000
Sub-Total					257,000		393,000		30,000		30,000	750,000	81	604,000
Civil Works														
Housing														
Type B	94,500	-	-	1	94,500	-	-	-	-	-	-	94,500	45	42,500
Type C	60,800	-	-	5	304,000	-	-	-	-	-	-	304,000	45	136,800
Type D	3,000	-	-	15	45,000	-	-	-	-	-	-	45,000	20	9,000
Rehabilitation of Existing Facilities	-	-	-	Sum	300,000	-	-	-	-	-	-	300,000	45	135,000
Well and Piping	360,000	-	-	1	360,000	-	-	-	-	-	-	360,000	45	162,000
Building for Generator	1,350	-	-	16 m^2	21,600	-	-	-	-	-	-	21,600	45	9,720
Library	1,350	-	-	30 m^2	40,500	-	-	-	-	-	-	40,500	45	18,225
Workshop	1,350	-	-	150 m^2	202,500	-	-	-	-	-	-	202,500	45	91,125
Toilet Facilities	1,350	-	-	30 m^2	40,500	-	-	-	-	-	-	40,500	45	18,225
Open Shed	500			100 m^2	50,000	-	-	-	-	-	-	50,000	45	22,500
Animal Shed	1,000	-	-	100 m^2	100,000	-	-	-	-	-	-	100,000	45	45,000
Water Catchment, Storage, Reticulation	-	-	-	Sum	115,000	Sum	115,000	-	-	-	-	230,000	45	103,500
Sub-Total					1,873,600		315,000					2,188,600	45	973,600
Total Capital Costs					2,130,600		708,000		30,000		30,000	2,938,600	54	1,577,600
Operating Costs														
Salaries and Wages														
Principal (Grade A)	30,000	-	-	1	30,000	1	30,000	1	30,000	1	30,000	120,000	-	-
Farming System Specialist	18,000	-	-	1	18,000	1	18,000	1	18,000	1	18,000	72,000	-	-
Plant Protection Specialist	18,000	-	-	1	18,000	1	18,000	1	18,000	1	18,000	72,000	-	-
Ag. Machinery and Implements Specialist	18,000	-	-	1	18,000	1	18,000	1	18,000	1	18,000	72,000	-	-
Farm Manager (ETC Farm)	18,000	-	-	1	18,000	1	18,000	1	18,000	1	18,000	72,000	-	-
Permanent Labor	6,000	-	-	5	30,000	5	30,000	5	30,000	5	30,000	120,000	-	-
Cleaning Staff	6,000	-	-	2	12,000	2	12,000	2	12,000	2	12,000	48,000	-	-
Cooking Staff	6,000	-	-	4	24,000	4	24,000	4	24,000	4	24,000	96,000	-	-
Watchman	6,000	-	-	2	12,000	2	12,000	2	12,000	2	12,000	48,000	-	-
Messenger	6,000	-	-	1	6,000	1	6,000	1	6,000	1	6,000	24,000	-	-
Clerk Typist	8,000	-	-	1	8,000	1	8,000	1	8,000	1	8,000	32,000	-	-
Workshop Manager	18,000	-	-	1	18,000	1	18,000	1	18,000	1	18,000	72,000	-	-
Mechanic	16,000	-	-	1	16,000	1	16,000	1	16,000	1	16,000	64,000	-	-
Sub-Total					228,000		228,000		228,000		228,000	912,000	-	-
Other Operating Costs														
4-Wheel Drive - POL	40,000	-	-	-	-	1	40,000	1	40,000	1	40,000	120,000	90	108,000
Tractor - POL	20,000	-	-	-	-	1	20,000	1	20,000	1	20,000	60,000	90	54,000
Animal Feed	-	-	-	-	-	Sum	3,000	Sum	3,000	Sum	3,000	9,000	-	-
Office/Teaching Supplies	-	-	-	Sum	5,000	Sum	5,000	Sum	5,000	Sum	5,000	20,000	90	18,000
Utilities	-	-	-	-	-	Sum	110,000	Sum	110,000	Sum	110,000	330,000	90	297,000
Building Maintenance	-	-	-	Sum	30,000	Sum	30,000	Sum	30,000	Sum	30,000	120,000	45	54,000
Miscellaneous	-	-	-	-	-	Sum	10,000	Sum	10,000	Sum	10,000	30,000	90	27,000
Sub-Total					35,000		218,000		218,000		218,000	689,000	81	558,000
Total Operating Costs					2,165,600		926,000		268,000		266,000	1,627,600	59	1,135,600
Total Base Costs					4,296,200		1,634,000		318,000		318,000	6,566,200	57	3,713,600

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TABLE 6

SOMALIA

AGRICULTURAL EXTENSION AND FARM MANAGEMENT TRAINING PROJECT

Farm Management and Extension Training Center (FMETC) - Afgoi
(So.Sh.)

	Unit Costs	Year 1		Year 2		Year 3		Year 4		Year 5		Total Costs	Foreign Exchange %	Foreign Exchange Total
Capital Costs														
Vehicles and Equipment														
4 Wheel Drive	92,000	-	-	1	92,000	1	92,000	-	-	-	-	184,000	90	165,600
Passenger Car	45,000	-	-	1	45,000	-	-	-	-	-	-	45,000	90	40,500
Motorbike	5,600	-	-	2	11,200	-	-	-	-	-	-	11,200	90	10,080
Bus - 27 Seater	195,000	-	-	1	195,000	-	-	-	-	-	-	195,000	90	175,500
Truck - 7 ton	175,000	-	-	1	175,000	-	-	-	-	-	-	175,000	90	157,500
Workshop - Training Equipment	-	-	-	Sum	375,000	-	-	-	-	-	-	375,000	90	337,500
Draft Animals	1,200	-	-	-	-	5	6,000	-	-	-	-	6,000	-	-
Library - Equipment and Books		-	-	Sum	100,000	Sum	100,000	-	-	-	-	200,000	90	180,000
Machinery and Equipment - 60 ha Training Farm	-	-	-	Sum	561,000	-	-	-	-	-	-	561,000	90	504,900
Irrigation Machinery and Equipment - 60 ha Training Farm	-	-	-	Sum	468,000	-	-	-	-	-	-	468,000	90	421,200
Furniture and Equipment - Housing	-	-	-	Sum	533,600	-	-	-	-	-	-	533,600	90	480,240
Furniture and Equipment - FMETC	-	-	-	Sum	324,580	-	-	-	-	-	-	324,580	90	292,122
Furniture and Equipment - Offices	-	-	-	Sum	334,100	-	-	-	-	-	-	334,100	90	300,690
Furniture and Equipment - Workshop	-	-	-	Sum	81,000	-	-	-	-	-	-	81,000	90	72,900
Sub-Total					3,295,480		198,000					3,493,480		3,138,732
Civil Works														
Housing														
Type A	234,000	-	-	8	1,872,000	-	-	-	-	-	-	1,872,000	45	842,400
Type B	94,500	-	-	10	945,000	7	661,500	-	-	-	-	1,606,500	45	722,925
Type C	60,800	-	-	1	60,800	-	-	-	-	-	-	60,800	45	27,360
Type D	3,000	-	-	47	141,000	-	-	-	-	-	-	141,000	20	28,200
Library	-	-	-	75 m^2	101,250	-	-	-	-	-	-	101,250	45	45,563
Classrooms	-	-	-	336 m^2	453,600	-	-	-	-	-	-	453,600	45	204,120
Lecture Hall	-	-	-	128 m^2	172,800	-	-	-	-	-	-	172,800	45	77,760
Offices	-	-	-	825 m^2	1,113,750	-	-	-	-	-	-	1,113,750	45	501,188
Dormitories	-	-	-	225 m^2	303,750	-	-	-	-	-	-	303,750	45	136,688
Workshop	-	-	-	200 m^2	270,000	-	-	-	-	-	-	270,000	45	121,500
Kitchen	-	-	-	60 m^2	81,000	-	-	-	-	-	-	81,000	45	36,450
Toilet Facilities	-	-	-	30 m^2	40,500	-	-	-	-	-	-	40,500	45	18,225
Laundry Facilities	-	-	-	50 m^2	67,500	-	-	-	-	-	-	67,500	45	30,375
Dining Facilities	-	-	-	180 m^2	243,000	-	-	-	-	-	-	243,000	45	109,350
Animal Sheds	-	-	-	100 m^2	100,000	-	-	-	-	-	-	100,000	45	45,000
Open Sheds	-	-	-	200 m^2	100,000	-	-	-	-	-	-	100,000	45	45,000
60 ha Farm - Land Preparation	-	Sum	832,000	-	-	-	-	-	-	-	-	832,000	45	374,400
Storage Facilities - 60 ha Farm	-	-	-	Sum	50,000	-	-	-	-	-	-	50,000	45	22,500
Well and Piping	-	1	360,000	-	-	-	-	-	-	-	-	360,000	45	162,000
Water Catchment, Storage, Reticulation 1/	-	-	-	Sum	315,000	Sum	315,000	-	-	-	-	630,000	45	283,500
Sub-Total			1,192,000		6,430,950		976,500					8,599,450		3,834,504
Total Capital Costs			1,192,000		9,726,430		1,174,500					12,092,930	-	-
Operating Costs														
Salaries and Wages 2/														
Principal FMETC */	504,000	1	504,000	1	504,000	1	504,000	1	504,000	1	504,000	2,520,000	100	2,520,000
Deputy Principal 1 (Grade A)	30,000	1	30,000	1	95,000	1	95,000	1	30,000	1	30,000	280,000	70	190,000
Deputy Principal 2 (Grade A)	30,000	1	30,000	1	30,000	1	30,000	1	95,000	1	95,000	280,000	70	190,000
Secretary	9,000	1	9,000	1	9,000	1	9,000	1	9,000	1	9,000	45,000	-	-
Clerk Typist	8,000	-	-	3	24,000	8	64,000	8	64,000	5	54,000	215,000	-	-
Messenger	6,000	1	6,000	1	6,000	1	6,000	1	6,000	1	6,000	30,000	-	-
Driver	9,000	1	9,000	3	27,000	6	54,000	8	72,000	8	72,000	234,000	-	-
Other Support Staff and Permanent Labor	-	-	-	Sum	20,000	Sum	150,000	Sum	150,000	Sum	150,000	470,000	-	-
Agronomist, rainfed Agriculture */	504,000	-	-	0.5	252,000	1	504,000	1	504,000	1	504,000	1,764,000	100	1,764,000
Deputy Agronomist 1 (Grade A)	30,000	-	-	0.5	15,000	1	95,000	1	95,000	1	30,000	235,000	85	190,000
Deputy Agronomist 2 (Grade A)	30,000	-	-	0.5	15,000	1	30,000		95,000		95,000	235,000	85	190,000
Agronomist, irrigated Agriculture */	504,000	-	-	0.5	252,000	1	504,000	1	504,000	1	504,000	1,764,000	100	1,764,000
Deputy Agronomist 1 (Grade A)	30,000	-	-	0.5	15,000	1	95,000	1	95,000	1	30,000	235,000	85	190,000
Deputy Agronomist 2 (Grade A)	30,000	-	-	0.5	15,000	1	30,000	1	95,000	1	95,000	235,000	85	190,000
Plant Protection Specialist (Grade A)	30,000	-	-	0.5	15,000	1	30,000	1	30,000	1	30,000	105,000	-	-
Livestock Specialist (Grade A)	30,000	-	-	0.5	15,000	1	30,000	1	30,000	1	30,000	105,000	-	-
Agricultural Engineer */	504,000	-	-	0.5	252,000	1	504,000	1	504,000	1	504,000	1,764,000	100	1,764,000
Deputy Agricultural Engineer 1 (Grade A)	30,000	-	-	0.5	15,000	1	95,000	1	95,000	1	30,000	235,000	85	190,000
Deputy Agricultural Engineer 2 (Grade A)	30,000	-	-	0.5	15,000	1	30,000	1	95,000	1	95,000	235,000	85	190,000
Master Mechanic */	504,000	-	-	0.5	252,000		504,000	1	504,000	1	504,000	1,764,000	100	1,764,000
Deputy Master Mechanic 1 (Grade A)	30,000	-	-	0.5	15,000	1	95,000	1	95,000	1	30,000	235,000	85	190,000
Deputy Master Mechanic 2 (Grade A)	30,000	-	-	0.5	15,000	1	30,000	1	95,000	1	95,000	235,000	85	190,000
Farm Management Specialist */	504,000	-	-	0.5	252,000	1	504,000	1	504,000	1	504,000	1,764,000	100	1,764,000
Deputy Farm Management Specialist 1 (Grade A)	30,000	-	-	0.5	15,000	1	95,000	1	95,000	1	30,000	235,000	85	190,000
Deputy Farm Management Specialist 2 (Grade A)	30,000	-	-	0.5	15,000	1	30,000	1	95,000	1	95,000	235,000	85	190,000
Farm Manager (60 ha Farm)(Grade A)	30,000	1	30,000	1	30,000	1	30,000	1	30,000	1	30,000	150,000	-	-
Trainees Subsistence and Allowances	-	-	-	-	-	Sum	600,000	Sum	1,300,000	Sum	1,300,000	3,200,000		
Livestock Specialist */	504,000	-	-	0.5	252,000	1	504,000	1	504,000	1	504,000	1,764,000	100	1,764,000
Sub-Total			618,000		2,437,000		5,251,000		6,294,000		5,549,000	20,369,000		[illegible]
Other Operating Costs														
4 Wheel Drive POL	35,000	-	-	1	35,000	2	70,000	2	70,000	2	70,000	245,000	90	220,500
Passenger Car POL	31,250	-	-	1	31,250	1	31,250	1	31,250	1	31,250	125,000	90	112,500
Motorbike POL	9,000	-	-	2	18,000	2	18,000	2	18,000	2	18,000	72,000	90	64,800
Bus POL	20,000	-	-	1	20,000	1	20,000	1	20,000	1	20,000	80,000	90	72,000
Truck POL	20,000	-	-	1	20,000	1	20,000	1	20,000	1	20,000	80,000	90	72,000
Allowances for Visiting Lecturers	-	-	-	-	-	Sum	200,000	Sum	200,000	Sum	200,000	600,000	-	-
Utilities	-	-	-	Sum	50,000	Sum	100,000	Sum	100,000	Sum	100,000	350,000	50	175,000
Office Supplies	-	Sum	50,000	Sum	50,000	Sum	50,000	Sum	50,000	Sum	50,000	250,000	90	225,000
Operating Costs - 60 ha Training Farm	-	-	-	Sum	50,000	Sum	150,000	Sum	150,000	Sum	150,000	500,000	75	375,000
Miscellaneous Items	-	-	-	Sum	50,000	Sum	100,000	Sum	100,000	Sum	100,000	350,000	75	262,500
Building Maintenance	-	-	-	-	-	-	-	-	-	-	-	-		-
Sub-Total			50,000		324,250		759,250		759,250		759,250	2,652,000		1,579,100
Total Operating Costs			668,000		2,761,250		6,010,250		7,053,250		6,728,250	23,221,000		[illegible]
Total Base Costs			1,860,000		12,487,580		7,184,750		7,053,250		6,728,250	35,313,330		[illegible]

*/ Internationally recruited.

1/ Facilities for collection of rainwater off roofs, storing it in large groundlevel tanks with elevated small tanks filled by a small electric powered pump to supply gravity fed reticulated water for ablutions, lab and workshop areas.

2/ Including per diem and field allowances for staff and training costs for those sent abroad for formal training.

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TABLE 7

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AGRICULTURAL EXTENSION AND FARM MANAGEMENT TRAINING PROJECT

Physical Requirements of the FMTC Training Farm

A. Agricultural Equipment and Machinery for the 60 ha Training Farm at Afgoi

(So.Sh.)

Item	Years 1	2	3	4	5	Total
3 Tractors @ 94,000	-	282,000	-	-	-	282,000
3 Garden Tractors @ 18,000	-	54,000	-	-	-	54,000
Implements for above 2 items	-	72,000	-	-	-	72,000
2 Trailers	-	50,000	-	-	-	50,000
1 Rice thresher	-	20,000	-	-	-	20,000
1 Tumbler plough	-	5,000	-	-	-	5,000
1 Maize Sheller	-	20,000	-	-	-	20,000
Meteorological equipment	-	5,000	-	-	-	5,000
Soil Testing Equipment	-	1,000	-	-	-	1,000
5 Knapsack Sprayers	-	1,750	-	-	-	1,750
2 Power Sprayers	-	20,000	-	-	-	20,000
2 Cultivators	-	30,000	-	-	-	30,000
Sub-Total A.	-	560,750	-	-	-	560,750
B. Irrigation Related Machinery and Equipment						
1 Dozer Backhoe (55 hp)	-	200,000	-	-	-	200,000
1 Ripper	-	13,000	-	-	-	13,000
1 Land Plain	-	20,000	-	-	-	20,000
1 Irrigation Plow	-	44,000	-	-	-	44,000
1 Border Ridger	-	22,000	-	-	-	22,000
1 Ditcher	-	20,000	-	-	-	20,000
Handtools	-	5,000	-	-	-	5,000
Syphon Tubes	-	7,000	-	-	-	7,000
Spare Parts (incl. parts for existing pumps and engine)	-	137,000	-	-	-	137,000
Sub-Total B.	-	468,000	-	-	-	468,000
C. Operating Costs						
3 Tractors @ 800 hours per annum	-	-	43,200	43,200	43,200	129,600
Inputs	-	-	60,000	60,000	60,000	180,000
Irrigation Related Costs						
Tractor Operation	-	-	26,000	26,000	26,000	78,000
Pump Operation	-	-	17,000	17,000	17,000	51,000
Sub-Total C.	-	-	146,200	146,200	146,200	438,600
GRAND TOTAL	-	1,028,750	146,200	146,200	146,200	1,467,350

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AGRICULTURAL EXTENSION AND FARM MANAGEMENT TRAINING PROJECT

PROJECT MANAGEMENT UNIT 1/

TABLE 8

	Unit Costs	Year 1		Year 2		Year 3		Year 4		Year 5		Total Costs	Foreign Exchange %	Foreign Exchange Total
Capital Costs														
Vehicles and Equipment														
Animal Drive	90,000	-	-	2	184,000	5	460,000	-	-	-	-	644,000	90	579,600
Passenger Car	45,000	-	-	2	90,000	-	-	-	-	-	-	90,000	90	81,000
Motorbikes	5,600	-	-	3	16,800	12	67,200	-	-	-	-	84,000	90	75,600
Furniture and Equipment - Offices	-	-	-	Sum	207,000	Sum	112,000	-	-	-	-	319,000	90	287,100
Furniture and Equipment - Houses		-	-	Sum	302,000	Sum	138,000	-	-	-	-	440,000	90	396,000
Sub-Total					799,800		777,200					1,577,000	90	1,419,300
Civil Works														
Housing														
Type A	234,000	-	-	2	468,000	-	-	-	-	-	-	468,000	45	210,600
Type B	94,500	-	-	7	661,500	3	283,500	-	-	-	-	945,000	45	425,300
Type C	60,800	-	-	6	364,800	3	182,400	-	-	-	-	547,200	45	246,300
Type D	3,000	-	-	17	51,000	27	81,000	-	-	-	-	132,000	20	26,400
Offices	1,350	-	-	300 m^2	486,000	275 m^2	371,250	-	-	-	-	857,250	45	385,800
Conference Room	1,350	-	-	150 m^2	202,500	-	-	-	-	-	-	202,500	45	91,200
Open Shed	500	-	-	100 m^2	50,000	100 m^2	50,000	-	-	-	-	100,000	45	45,000
Water Catchment, Storage, Reticulation		-	-	Sum	315,000	Sum	315,000	-	-	-	-	630,000	45	283,500
Sub-Total					2,598,800		1,283,150					3,881,950	44	1,714,100
Total Capital Costs					3,398,600		2,060,350					5,458,950	57	3,133,400
Operating Costs														
Salaries and Wages 2/														
Project Director (Grade A)	60,000	1	60,000	1	60,000	1	60,000	1	60,000	1	60,000	300,000	-	-
Project Deputy Director (Grade A)	30,000	1	30,000	1	95,000	1	95,000	1	30,000	1	30,000	280,000	68	190,000
Project Technical Manager */	504,000	1	504,000	1	504,000	1	504,000	1	504,000	1	504,000	2,520,000	100	2,520,000
Deputy Technical Manager 1 (Grade A)	30,000	1	30,000	1	95,000	1	95,000	1	30,000	1	30,000	280,000	68	190,000
Deputy Technical Manager 2 (Grade A)	30,000	1	30,000	1	30,000	1	30,000	1	95,000	1	95,000	280,000	68	190,000
Financial Controller */	504,000	1	504,000	1	504,000	1	504,000	1	504,000	1	504,000	2,520,000	100	2,520,000
Deputy Financial Controller 1 (Grade A)	30,000	1	30,000	1	95,000	1	95,000	1	30,000	1	30,000	280,000	68	190,000
Deputy Financial Controller 2 (Grade A)	30,000	1	30,000	1	30,000	1	30,000	1	95,000	1	95,000	280,000	68	190,000
Monitoring and Evaluation Spec.(Gr. A)	30,000	1	30,000	1	30,000	1	30,000	1	30,000	1	30,000	150,000	-	-
Assist. Monitoring and Eval. Specialist	18,000	1	18,000	1	18,000	1	18,000	1	18,000	1	18,000	90,000	-	-
Accountant	17,000	1	17,000	1	17,000	1	17,000	1	17,000	1	17,000	85,000	-	-
Procurement Officer	17,000	1	17,000	1	17,000	1	17,000	1	17,000	1	17,000	85,000	-	-
Personnel Officer	16,000	1	16,000	1	16,000	1	16,000	1	16,000	1	16,000	80,000	-	-
Assistant Accountant	15,000	2	30,000	2	30,000	2	30,000	2	30,000	2	30,000	150,000	-	-
Accounts Clerks	10,000	2	20,000	2	20,000	2	20,000	2	20,000	2	20,000	100,000	-	-
Secretary	9,000	2	18,000	2	18,000	2	18,000	2	18,000	2	18,000	90,000	-	-
Clerk/Typist	8,000	5	40,000	7	56,000	11	88,000	11	88,000	11	88,000	360,000	-	-
Messenger	6,000	1	6,000	1	6,000	2	12,000	2	12,000	2	12,000	48,000	-	-
Driver	9,000	-	-	4	36,000	9	81,000	9	81,000	9	81,000	279,000	-	-
Data Collection Section (Monitoring)														
Statistical Officer (Grade A)	30,000	1	30,000	1	30,000	1	30,000	1	30,000	1	30,000	150,000	-	-
Senior Enumerator	10,000	-	-	4	40,000	4	40,000	4	40,000	4	40,000	160,000	-	-
Junior Enumerator	9,000	-	-	12	108,000	12	108,000	12	108,000	12	108,000	432,000	-	-
Clerk Typist	8,000	-	-	4	32,000	4	32,000	4	32,000	4	32,000	128,000	-	-
Data Processing Unit (Monitoring)														
Ag. Economist (Grade A)	30,000	1	30,000	1	30,000	1	30,000	1	30,000	1	30,000	150,000	-	-
Statistical Assistant	9,000	1	9,000	2	18,000	2	18,000	2	18,000	2	18,000	81,000	-	-
Clerk Typist	8,000	1	8,000	2	16,000	2	16,000	2	16,000	2	16,000	72,000	-	-
Consultancy Services 3/		Sum	630,000	Sum	630,000	Sum	630,000	Sum	630,000	Sum	630,000	3,150,000	100	3,150,000
Sub-Total			2,137,000		2,561,000		2,674,000		2,599,000		2,599,000	12,580,000	72	9,140,000
Other Operating Costs														
Animal Drive	42,000	-	-	2	84,000	7	294,000	7	294,000	7	294,000	966,000	90	869,400
Passenger Car	31,250	-	-	2	62,500	2	62,500	2	62,500	2	62,500	250,000	90	225,000
Motorbike	9,000	-	-	3	27,000	15	135,000	15	135,000	15	135,000	432,000	90	388,800
Utilities	-	-	-	Sum	5,000	Sum	10,000	Sum	10,000	Sum	10,000	35,000	50	17,500
Office Supplies	-	Sum	50,000	Sum	60,000	Sum	120,000	Sum	120,000	Sum	120,000	470,000	90	423,000
Rent - Houses and Offices and Cars	-	Sum	630,000	-	-	-	-	-	-	-	-	630,000	-	-
Building Maintenance	-	-	-	Sum	90,000	Sum	90,000	Sum	90,000	Sum	90,000	360,000	45	162,000
Miscellaneous	-	Sum	50,000	Sum	50,000	Sum	50,000	Sum	50,000	Sum	50,000	250,000		
Sub-Total			730,000		378,500		761,500		761,500		761,500	3,393,000	61	2,085,300
Total Operating Costs			2,867,000		2,959,500		3,425,500		3,360,500		3,360,500	15,973,000	70	11,225,000
Total Base Costs			2,867,000		6,358,000		5,485,850		3,360,500		3,360,500	21,431,950	67	14,358,400

1/ Including Monitoring and Evaluation
2/ Including Costs of Training Abroad
3/ To help PMU with procurement and to undertake necessary studies, including those needed for preparing a second phase Project if this becomes necessary.

*/ Internationally Recruited.

1/16/79
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SOMALIA

AGRICULTURAL EXTENSION AND FARM MANAGEMENT TRAINING PROJECT

Farm Management Advisory Service 1/

Headquarters

	Unit Cost	Year 1		Year 2		Year 3		Year 4		Year 5		Total Costs	Foreign Exchange %	Foreign Exchange Total
Capital Costs														
Vehicles and Equipment														
4-Wheel Drive	92,000	-	-	1	92,000	-	-	-	-	-	-	92,000	90	82,800
Motorbike	5,600	-	-	2	11,200	-	-	-	-	-	-	11,200	90	10,080
Furniture and Equipment - Offices	-	-	-	Sum	270,000	Sum	17,000	-	-	-	-	287,000	90	258,300
Furniture and Equipment - Houses	-	-	-	Sum	180,000	Sum	12,000	-	-	-	-	192,000	90	173,000
Sub-Total					533,200		29,000	-	-	-	-	582,200	90	524,180
Civil Works														
Housing														
Type A	234,000	-	-	2	468,000	-	-	-	-	-	-	468,000	45	211,200
Type B	94,500	-	-	4	378,000	-	-	-	-	-	-	378,000	45	170,100
Type B	3,000	-	-	4	12,000	-	-	-	-	-	-	12,000	20	2,400
Offices	1,350	-	-	200 m^2	270,000	-	-	-	-	-	-	270,000	45	121,500
Water catchment, Storage, Reticulation	-	-	-	Sum	315,000	Sum	315,000	-	-	-	-	630,000	45	283,500
Sub-Total					1,443,000		315,000	-	-	-	-	1,758,000	45	788,500
Total Capital Costs					1,996,200		344,200	-	-	-	-	2,340,200	56	1,312,700
Operating Costs														
Salaries and Wages														
Farm Management Specialist */	504,000	0.5	252,000	1	504,000	1	504,000	1	504,000	1	504,000	2,268,000	100	2,268,000
Deputy Farm Management Specialist 1 (Grade A)	30,000	0.5	15,000	1	95,000	1	95,000	1	30,000	1	30,000	265,000	72	190,800
Deputy Farm Management Specialist 2 (Grade A)	30,000	0.5	15,000	1	30,000	1	30,000	1	95,000	1	95,000	265,000	72	190,800
Farm Economist */	504,000	0.5	252,000	1	504,000	1	504,000	1	504,000	1	504,000	2,268,000	100	2,268,000
Deputy Farm Economist 1 (Grade A)	30,000	0.5	15,000	1	95,000	1	95,000	1	30,000	1	30,000	265,000	72	190,800
Deputy Farm Economist 2 (Grade A)	30,000	0.5	15,000	1	30,000	1	30,000	1	95,000	1	95,000	265,000	72	190,800
Clerk/Typist/Statistical Clerk	8,000	0.5	4,000	2	16,000	3	24,000	3	24,000	3	24,000	92,000	-	-
Messenger	6,000	0.5	3,000	1	6,000	1	6,000	1	6,000	1	6,000	27,000	-	-
Driver	9,000	0.5	4,500	1	9,000	1	9,000	1	9,000	1	9,000	40,500	-	-
Statistical Assistant	18,000	0.5	9,000	1	18,000	1	18,000	1	18,000	1	18,000	81,000	-	-
Study Trips (one years)	94,500	-	-	0.25	23,700	0.25	23,700	0.25	23,700	-	-	71,100	100	71,100
Sub-Total			584,500		1,330,700		1,338,700		1,338,700		1,315,000	5,907,600	91	5,367,100
Other Operating Costs														
4-Wheel Drive	42,000	-	-	1	42,000	1	42,000	1	42,000	1	42,000	168,000	90	151,200
Motorbike	9,000	-	-	2	18,000	2	18,000	2	18,000	2	18,000	72,000	90	65,000
Office Supplies and Utilities	-	Sum	25,000	Sum	25,000	Sum	25,000	Sum	25,000	Sum	25,000	125,000	90	113,000
Building Maintenance	-	-	-	Sum	18,000	Sum	18,000	Sum	18,000	Sum	18,000	72,000	45	33,000
Sub-Total			25,000		103,000		103,000		103,000		103,000	437,000	83	362,000
Total Operating Costs			609,500		1,433,700		1,441,700		1,441,700		1,418,000	6,344,600	90	5,729,100
Total Base Costs			609,500		3,429,900		1,785,700		1,441,700		1,418,000	8,684,800	81	7,041,800

*/ Internationally Recruited.

1/ Including Demonstration State Farm.

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TABLE 10

SOMALIA

AGRICULTURAL EXTENSION AND FARM MANAGEMENT TRAINING PROJECT

Farm Management Advisory Service
Demonstration State Farm

	Unit Cost	Year 1		Year 2		Year 3		Year 4		Year 5		Total Costs	Foreign Exchange %	Foreign Exchange Total
Capital Costs														
Vehicles and Equipment														
4 Wheel Drive	92,000	1	92,000	1	92,000	-	-	-	-	1	92,000	276,000	90	248,400
4 Wheel Drive pick-up	92,000	-	-	1	92,000	-	-	-	-	-	-	92,000	90	82,800
Truck-tipper - 7 ton	194,000	-	-	1	194,000	-	-	-	-	-	-	194,000	90	174,600
Tractor 65 - 70 hp	102,000	-	-	3	306,000	-	-	-	-	-	-	306,000	90	275,400
Tractor 100 - 120 hp	173,000	-	-	2	346,000	-	-	-	-	-	-	346,000	90	311,400
Trailer - 4 ton	25,000	-	-	3	75,000	-	-	-	-	-	-	75,000	90	67,500
Combine	300,000	-	-	2	600,000	-	-	-	-	-	-	600,000	90	540,000
Cultivator	15,000	-	-	3	45,000	-	-	-	-	-	-	45,000	90	40,500
Disc Plough	11,000	-	-	2	22,000	-	-	-	-	-	-	22,000	90	19,800
Maize planter	25,000	-	-	1	25,000	-	-	-	-	-	-	25,000	90	22,500
Knapsack Sprayer	500	-	-	6	3,000	-	-	-	-	-	-	3,000	90	2,700
Seed Drill	12,000	-	-	2	24,000	-	-	-	-	-	-	24,000	90	21,600
Mounted Sprayer (10 m)	21,000	-	-	2	42,000	-	-	-	-	-	-	42,000	90	37,800
Fertiliser Broadcaster	3,500	-	-	2	7,000	-	-	-	-	-	-	7,000	90	6,300
Tooth Harrow (3 m)	3,200	-	-	2	6,400	-	-	-	-	-	-	6,400	90	5,800
Light Harrow (3 m)	2,500	-	-	3	7,500	-	-	-	-	-	-	7,500	90	6,850
Disc Harrow	12,000	-	-	2	24,000	-	-	-	-	-	-	24,000	90	21,600
Miscellaneous Tools	-	-	-	Sum	30,000	-	-	-	-	-	-	30,000	90	27,000
Irrigation Equipment														
Mouldboard Plough	44,000	-	-	2	88,000	-	-	-	-	-	-	88,000	90	79,200
Tractor Dozer	296,000	-	-	1	296,000	-	-	-	-	-	-	296,000	90	266,400
Border Ridger	22,000	-	-	1	22,000	-	-	-	-	-	-	22,000	90	19,800
Tooth Ripper	13,000	-	-	3	39,000	-	-	-	-	-	-	39,000	90	35,100
Ditcher	40,000	-	-	1	40,000	-	-	-	-	-	-	40,000	90	36,000
Miscellaneous Tools	-	-	-	Sum	160,000	-	-	-	-	-	-	160,000	90	144,000
Furniture and Equipment - Offices	-	-	-	Sum	102,000	-	-	-	-	-	-	102,000	90	91,800
Furniture and Equipment - Houses	-	Sum	10,000	Sum	30,000	Sum	10,000	-	-	-	-	50,000	90	45,000
Sub-Total			102,000		2,717,900		10,000				92,000	2,921,900	90	2,629,600
Civil Works														
Housing														
Type A	234,000	1	234,000	-	-	-	-	-	-	-	-	234,000	45	105,300
Type B	94,500	2	189,000	1	94,500	-	-	-	-	-	-	283,500	45	127,600
Type C	60,800	-	-	10	608,000	-	-	-	-	-	-	608,000	45	273,500
Type D	3,000	2	6,000	41	123,000	2	6,000	-	-	-	-	135,000	20	27,000
Office	1,350	-	-	160 m^2	216,000	-	-	-	-	-	-	216,000	45	97,200
Open Sheds	500	-	-	300 m^2	150,000	-	-	-	-	-	-	150,000	45	67,500
Storage for Inputs and Produce	1,000	-	-	150 m^2	150,000	-	-	-	-	-	-	150,000	45	67,500
Workshop	1,350	-	-	100 m^2	135,000	-	-	-	-	-	-	135,000	45	60,800
Shed - crop drying	500	-	-	300 m^2	150,000	-	-	-	-	-	-	150,000	45	67,500
Irrigation Works	-	Sum	2,000,000	Sum	2,000,000	Sum	800,000	-	-	-	-	4,800,000	75	3,600,000
Water catchment, storage, reticulation	-	Sum	315,000	Sum	315,000	-	-	-	-	-	-	630,000	45	[illegible]
Sub-Total			2,744,000		3,941,500		806,000					7,491,500	64	4,777,400
Total Capital Costs			2,846,000		6,659,400		816,000				92,000	10,413,400	71	[illegible]
Operating Costs														
Salaries and Wages 1/														
D.S.F. Manager *7	504,000	1	504,000	1	504,000	1	504,000	1	504,000	1	504,000	2,520,000	100	2,520,000
Assistant Manager 1 (Grade A)	30,000	1	30,000	1	95,000	1	95,000	1	30,000	1	30,000	280,000	70	195,000
Assistant Manager 2 (Grade A)	30,000	1	30,000	1	30,000	1	30,000	1	95,000	1	95,000	280,000	70	195,000
Field Manager	18,000	1	-	-	-	3	54,000	3	54,000	3	54,000	162,000	-	-
Foreman	16,000	-	-	-	-	9	144,000	9	144,000	9	144,000	432,000	-	-
Accountant	17,000	1	17,000	1	17,000	1	17,000	1	17,000	1	17,000	85,000	-	-
Store Keeper	12,000	-	-	1	12,000	1	12,000	1	12,000	1	12,000	48,000	-	-
Assistant Storekeepers	8,000	-	-	1	8,000	1	8,000	1	8,000	1	8,000	32,000	-	-
Chief Mechanic	18,000	-	-	-	-	1	18,000	1	18,000	1	18,000	54,000	-	-
Assistant Mechanic	15,000	-	-	-	-	1	15,000	1	15,000	1	15,000	45,000	-	-
Clerk/Typist/Statistician	8,000	1	8,000	1	8,000	2	16,000	3	24,000	3	24,000	80,000	-	-
Driver	9,000	1	9,000	2	18,000	3	27,000	3	27,000	3	27,000	108,000	-	-
Irrigation Foreman	16,000	-	-	2	32,000	2	32,000	2	32,000	2	32,000	128,000	-	-
Permanent Labor - Irrigation	8,000	-	-	15	120,000	15	120,000	15	120,000	15	120,000	480,000	-	-
Plant Protection Foreman	16,000	-	-	1	16,000	1	16,000	1	16,000	1	16,000	64,000	-	-
Permanent Labor - Plant Protection	8,000	-	-	6	48,000	6	48,000	6	48,000	6	48,000	192,000	-	-
Farm Machinery Foreman	16,000	-	-	1	16,000	1	16,000	1	16,000	1	16,000	64,000	-	-
Driver	9,000	-	-	7	63,000	7	63,000	7	63,000	7	63,000	252,000	-	-
Temporary Labor (So.Sh.15/man day)		-	-	Sum	97,500	Sum	195,000	Sum	390,000	Sum	390,000	[illegible]	-	-
Sub Total			598,000		1,086,500		1,430,000		1,633,000		1,633,000	6,378,500	46	2,900,000
Other Operating Costs														
4-Wheel Drive	42,000	1	42,000	3	126,000	3	126,000	3	126,000	4	168,000	588,000	90	530,000
Truck-Tipper	30,000	-	-	1	30,000	1	30,000	1	30,000	1	30,000	120,000	90	108,000
Tractor 65-70 hp	15,000	-	-	3	45,000	3	45,000	3	45,000	3	45,000	180,000	90	162,000
Tractor 100 - 120 hp	25,000	-	-	2	50,000	2	50,000	2	50,000	2	50,000	200,000	90	180,000
Combine	25,000	-	-	2	50,000	2	50,000	2	50,000	2	50,000	200,000	90	180,000
Maintenance of Agric. Machinery	-	-	-	-	-	Sum	200,000	Sum	200,000	Sum	200,000	600,000	90	540,000
Inputs for DSF	-	-	-	Sum	100,000	Sum	200,000	Sum	300,000	-	-	600,000	75	450,000
Rent for Housing	-	Sum	100,000	-	-	-	-	-	-	-	-	100,000	-	-
Tractor-Dozer Operating Cost	30,000	-	-	1	30,000	1	30,000	1	30,000	1	30,000	120,000	90	108,000
Building Maintenance	-	Sum	20,000	Sum	60,000	Sum	70,000	Sum	70,000	Sum	70,000	290,000	45	131,000
Irrigation Structure Maintenance	-	Sum	20,000	Sum	60,000	Sum	70,000	Sum	70,000	Sum	70,000	290,000	45	131,000
Sub-Total			182,000		551,000		671,000		971,000		713,000	3,288,000	77	[illegible]
Total Operating Costs			780,000		1,637,500		2,101,000		2,604,000		2,346,000	9,666,500	56	[illegible]
Total Base Costs			3,626,000		8,296,900		3,117,000		2,604,000		2,438,000	20,079,900	60	12,027,[illegible]

1/ Including Costs of Training Abroad.

1/15/79
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SOMALIA

AGRICULTURAL EXTENSION AND FARM MANAGEMENT TRAINING PROJECT

AGRICULTURAL SECONDARY SCHOOL (AFGDI)

	Unit Cost	Year 1		Year 2		Year 3		Year 4		Year 5		Total Costs	Foreign Exchange %	Foreign Exchange Total
pital Costs														
Vehicles and Equipment														
4-Wheel Drive	92,000	2	184,000	-	-	-	-	-	-	-	-	184,000	90	165,500
Teaching Equipment	-	Sum	500,000	Sum	500,000	-	-	-	-	-	-	1,000,000	90	900,000
Library Equipment and Supplies	-	Sum	475,000	Sum	475,000	-	-	-	-	-	-	950,000	90	855,000
Laboratory Equipment	-	Sum	320,000	Sum	320,000	-	-	-	-	-	-	640,000	90	576,000
Printing Equipment	-	Sum	320,000	-	-	-	-	-	-	-	-	320,000	90	288,000
otal Capital Costs			1,799,000		1,295,000	-	-	-	-	-	-	3,094,000	90	2,784,500
perating Costs														
Salaries and Wages														
Agricultural Economist */	320,000	1	320,000	1	320,000	-	-	-	-	-	-	640,000	100	640,000
Agricultural Chemistry and Soil Science Specialist */	320,000	1	320,000	1	320,000	-	-	-	-	-	-	640,000	100	640,000
Agricultural Engineer	320,000	1	320,000	1	320,000	-	-	-	-	-	-	640,000	100	640,000
Animal Husbandry & Health Specialist *	320,000	1	320,000	1	320,000	-	-	-	-	-	-	640,000	100	640,000
Plant Protection Specialist */	320,000	1	320,000	1	320,000	-	-	-	-	-	-	640,000	100	640,000
Agriculturalist */	320,000	1	320,000	1	320,000	-	-	-	-	-	-	640,000	100	640,000
Agricultural Training Specialist */	380,000	1	380,000	1	380,000	-	-	-	-	-	-	760,000	100	760,000
Sub-Total			2,300,000		2,300,000	-	-	-	-	-	-	4,600,000	100	4,600,000
Other Operating Costs														
4-Wheel Drive	35,000	2	70,000	2	70,000	-	-	-	-	-	-	140,000	90	126,000
Training Supplies	-	Sum	150,000	Sum	150,000	-	-	-	-	-	-	300,000	90	270,000
Sub-Total			220,000		220,000	-	-	-	-	-	-	440,000	90	396,000
Total Operating Costs			2,520,000		2,520,000	-	-	-	-	-	-	5,040,000	99	4,996,000
Total Base Costs			4,319,000		3,815,000	-	-	-	-	-	-	8,134,000	96	7,780,500

*/ Internationally Recruited.

1/16/79
SB:el

TABLE 11

TABLE 12

SOMÁLIA

AGRICULTURAL EXTENSION AND FARM MANAGEMENT TRAINING PROJECT

Central Statistical Department (CSD)

	Unit Cost	Year 1		Year 2		Year 3		Year 4		Year 5		Total Costs	Foreign Exchange %	Foreign Exchange Total
Capital Costs														
Office Equipment 1/	-	Sum	160,000	Sum	160,000	-	-	-	-	-	-	320,000	90	288,000
Operating Costs														
Salaries and Wages														
Economist/Statistician*/	504,000	1	504,000	1	504,000	-	-	-	-	-	-	1,008,000	100	1,008,000
Agriculturalist/Statistician*/	504,000	0.5	252,000	1	504,000	-	-	-	-	-	-	756,000	100	756,000
Demographer/Statistician*/	504,000	0.5	252,000	1	504,000	-	-	-	-	-	-	756,000	100	756,000
Data Processing Specialist*/	504,000	1	504,000	1	504,000	-	-	-	-	-	-	1,008,000	100	1,008,000
Field Statistician	18,000	5	90,000	5	90,000	-	-	-	-	-	-	180,000	-	-
Field Statistical Assistants	12,000	10	120,000	10	120,000	-	-	-	-	-	-	240,000	-	-
Enumerators	9,000	40	360,000	40	360,000	-	-	-	-	-	-	720,000	-	
Sub-Total			2,082,000		2,586,000	-	-	-	-	-	-	4,668,000	76	3,528,000
Training Abroad (man-years)	95,000	7	665,000	7	665,000	-	-	-	-	-	-	1,330,000	100	1,330,000
CSD Training Institute	-	Sum	200,000	Sum	200,000	-	-	-	-	-	-	400,000	75	300,000
Total Operating Costs			2,947,000		3,451,000	-	-	-	-	-	-	6,398,000	81	5,158,000
Total Base Costs			3,107,000		3,611,000	-	-	-	-	-	-	6,718,000	81	5,446,000

1/ Books, manuals, calculators, photocopying equipment, rental of computer equipment, duplicating machine.

*/ Internationally recruited.

1/12/79

TABLE 13

[illegible]

[illegible]

[illegible] - [illegible]

(Ex. Rs. '000)

	Unit Cost		Year 1		Year 2		Year 3		Year 4		Year 5	Total Cost	Foreign
Vehicles and equipment													
PMC													
4 wheel drive	88.0	-	-	2	184.0	5	460.0	-	-	-	-	644.0	100
Passenger car	65.0	-	-	2	90.0	-	-	-	-	-	-	90.0	100
Motorbikes	9.6	-	-	3	16.8	12	67.8	-	-	-	-	84.0	100
Furniture & equipment - offices	-	-	-	Sum	277.0	Sum	112.0	-	-	-	-	389.0	100
Furniture & equipment - houses	-	-	-	Sum	360.0	Sum	120.0	-	-	-	-	480.0	100
PMAS (headquarters)													
4 wheel drive	88.0	-	-	1	88.0	-	-	-	-	-	-	88.0	100
Motorbikes	9.6	-	-	2	11.2	-	-	-	-	-	-	11.2	100
Furniture & equipment - offices	-	-	-	Sum	270.0	Sum	17.0	-	-	-	-	287.0	100
Furniture and equipment - houses	-	-	-	Sum	180.0	Sum	12.0	-	-	-	-	192.0	100
CTC													
Office equipment	-	Sum	160.0	Sum	160.0	-	-	-	-	-	-	320.0	100
Sub-total			160.0		1,313.0		806.8		-		-	2,479.8	100
Technical Assistance													
PMC													
Project Technical Manager	504.0	1	504.0	1	504.0	1	504.0	1	504.0	1	504.0	2,520.0	100
Financial Controller	504.0	1	504.0	1	504.0	1	504.0	1	504.0	1	504.0	2,520.0	100
PMAS													
Headquarters													
Farm management specialist	504.0	0.5	252.0	1	504.0	1	504.0	1	504.0	1	504.0	2,268.0	100
Farm Economist	504.0	0.5	252.0	1	504.0	1	504.0	1	504.0	1	504.0	2,268.0	100
Demonstration State Farm													
Farm Management specialist	504.0	1	504.0	1	504.0	1	504.0	1	504.0	1	504.0	2,520.0	100
CTC													
Economist/Statistician	504.0	1	504.0	1	504.0	-	-	-	-	-	-	1,008.0	100
Agriculturalist/Statistician	504.0	0.5	252.0	1	504.0	-	-	-	-	-	-	756.0	100
Demographer/Statistician	504.0	0.5	252.0	1	504.0	-	-	-	-	-	-	756.0	100
Data processing specialist	504.0	1	504.0	1	504.0	-	-	-	-	-	-	1,008.0	100
Sub-total			3,528.0		4,536.0		2,520.0		2,520.0		2,520.0	15,624.0	
Training Abroad													
PMC													
Ag. Economics	95.0	-	-	1	95.0	1	95.0	1	95.0	1	95.0	380.0	100
Accounting & Financial control	95.0	-	-	1	95.0	1	95.0	1	95.0	1	95.0	380.0	100
PMAS													
Headquarters													
Farm Management	95.0	-	-	1	95.0	1	95.0	1	95.0	1	95.0	380.0	100
Ag. Economics	95.0	-	-	1	95.0	1	95.0	1	95.0	1	95.0	380.0	100
Demonstration State Farm													
Farm Management	95.0	-	-	1	95.0	1	95.0	1	95.0	1	95.0	380.0	100
CTC													
Statistics	95.0	7	665.0	7	665.0	-	-	-	-	-	-	1,330.0	100
Sub-total			665.0		1,140.0		475.0		475.0		475.0	3,230.0	100
Study trips													
PMAS	95.0	-	-	0.25	23.7	0.25	23.7	0.25	23.7	-	-	71.1	100
Consultancy Services for procurement and preparation of phase II	-	Sum	630.0	Sum	630.0	Sum	630.0	Sum	630.0	Sum	630.0	3,150.0	100
Local salaries and wages													
PMC			499.0		630.0		751.0		772.0		771.0	3,423.0	-
PMATC			114.0		386.0		1,193.0		1,781.0		1,872.0	5,145.0	-
MRC			989.3		2,579.0		3,803.0		4,367.0		7,139.0	18,877.3	-
PMAS (headquarters)			80.5		109.0		117.0		117.0		117.0	540.5	-
DEP			-		-		-		1,034.0		1,034.0	2,068.0	-
CTC			570.0		570.0		-		-		-	1,140.0	-
Sub-Total			2,252.8		4,214.0		5,884.0		8,010.0		10,932.0	30,692.8	-
of which financed by IDA (80% of all local salaries (except DEP)			1,036.3		1,938.4		2,403.0		3,209.0		4,373.0	13,139.7	-
Other operating costs													
MRC			761.0		939.0		1,408.0		1,564.0		1,732.0	6,410.0	[illegible]
PMC			730.0		378.5		761.5		761.5		761.5	3,393.0	61
PMATC			90.0		384.3		759.3		759.3		759.3	2,752.2	60
PMAS (headquarters)			89.0		153.0		153.0		153.0		153.0	707.0	63
CTC			200.0		200.0		-		-		-	400.0	75
Sub-total			1,766.0		1,944.8		3,991.8		3,187.8		3,361.8	13,238.2	69
Total Base Costs			7,795.3		11,725.9		9,389.7		12,246.0		11,539.5	52,696.7	[illegible]
Physical Contingencies			191.6		339.5		373.8		324.8		324.2	1,554.2	[illegible]
Price Contingencies			792.5		2,372.3		2,620.0		1,223.0		4,502.0	11,510.0	[illegible]
Total Costs (Rs.Rs. '000)			8,669.4		14,362.0		12,663.5		13,704.8		17,366.0	66,155.7	66
Total Costs (US$'000)			1,756.0		2,813.0		2,772.0		2,[illegible]		2,[illegible]	[illegible]	66

January 31, 1979

SOMALIA

AGRICULTURAL EXTENSION AND FARM MANAGEMENT TRAINING PROJECT

TABLE 14

Project Financing 1/ - ADF
(So. Sh. '000)

	Base Costs	Year 1		Year 2		Year 3		Year 4		Year 5		Total Costs	Foreign Exchange %	Foreign Exchange Total
Vehicles and Equipment (DSF)														
4-Wheel Drive	92.0	1	92.0	1	92.0	-	-	-	-	-	92.0	276.0	90	248.4
4-Wheel Drive Pickup	92.0	-	-	1	92.0	-	-	-	-	-	-	92.0	90	82.8
Truck Tipper - 7 ton	194.0	-	-	1	194.0	-	-	-	-	-	-	194.0	90	174.6
Tractor 65 - 70 h.p.	122.0	-	-	3	366.0	-	-	-	-	-	-	366.0	90	329.4
Tractor 100 - 120 h.p.	173.0	-	-	2	346.0	-	-	-	-	-	-	346.0	90	311.4
Trailer - 4 ton	25.0	-	-	3	75.0	-	-	-	-	-	-	75.0	90	67.5
Combine	300.0	-	-	2	600.0	-	-	-	-	-	-	600.0	90	540.0
Cultivator	15.0	-	-	3	45.0	-	-	-	-	-	-	45.0	90	40.5
Disc Plough	11.0	-	-	2	22.0	-	-	-	-	-	-	22.0	90	19.8
Disc Planter	25.0	-	-	1	25.0	-	-	-	-	-	-	25.0	90	22.5
Knapsack Sprayer	.5	-	-	6	3.0	-	-	-	-	-	-	3.0	90	2.7
Seed Drill	12.0	-	-	2	24.0	-	-	-	-	-	-	24.0	90	21.6
Mounted Sprayer (10 m)	21.0	-	-	2	42.0	-	-	-	-	-	-	42.0	90	37.8
Fertiliser Broadcaster	3.5	-	-	2	7.0	-	-	-	-	-	-	7.0	90	6.3
Tooth Harrow (3 m)	3.2	-	-	2	6.4	-	-	-	-	-	-	6.4	90	5.8
Light Harrow (3 m)	2.5	-	-	3	7.5	-	-	-	-	-	-	7.5	90	6.8
Disc Harrow	12.0	-	-	2	24.0	-	-	-	-	-	-	24.0	90	21.6
Miscellaneous Tools	-	-	-	Sum	30.0	-	-	-	-	-	-	30.0	90	27.0
Irrigation Equipment														
Mouldboard Plough	44.0	-	-	2	88.0	-	-	-	-	-	-	88.0	90	79.2
Tractor Dozer	296.0	-	-	1	296.0	-	-	-	-	-	-	296.0	90	266.4
Border Ridger	22.0	-	-	1	22.0	-	-	-	-	-	-	22.0	90	19.8
Tooth Ripper	13.0	-	-	3	39.0	-	-	-	-	-	-	39.0	90	35.1
Ditcher	40.0	-	-	1	40.0	-	-	-	-	-	-	40.0	90	36.0
Miscellaneous Tools	-	-	-	Sum	160.0	-	-	-	-	-	-	160.0	90	144.0
Furniture and Equipment - Offices	-	-	-	Sum	120.0	-	-	-	-	-	-	120.0	90	91.8
Furniture and Equipment - Houses	-	Sum	10.0	Sum	30.0	Sum	10.0	-	-	-	-	50.0	90	45.0
Sub-Total			102.0		2,717.9		10.0				92.0	2 921.9		2,629.8
Local Salaries and Wages (DSF) 3/														
Ass't. Manager 1 (Grade A)	30.0	1	30.0	1	30.0	1	30.0	-	-	-	-	90.0	-	-
Ass't. Manager 2 (Grade A)	30.0	1	30.0	-	-	-	-	-	-	-	-	30.0	-	-
Field Manager	18.0	-	-	-	-	3	54.0	-	-	-	-	54.0	-	-
Foreman	16.0	-	-	-	-	9	144.0	-	-	-	-	144.0	-	-
Accountant	17.0	1	17.0	1	17.0	1	17.0	-	-	-	-	51.0	-	-
Storekeeper	12.0	-	-	1	12.0	1	12.0	-	-	-	-	24.0	-	-
Asst. Storekeeper	8.0	-	-	1	8.0	1	8.0	-	-	-	-	16.0	-	-
Chief Mechanic	18.0	-	-	-	-	1	18.0	-	-	-	-	18.0	-	-
Ass't. Mechanic	15.0	-	-	-	-	1	15.0	-	-	-	-	15.0	-	-
Clerk Typist/Statistician	8.0	1	8.0	1	8.0	2	16.0	-	-	-	-	32.0	-	-
Driver	9.0	1	9.0	2	18.0	3	27.0	-	-	-	-	54.0	-	-
Irrigation Foreman	16.0	-	-	2	32.0	2	32.0	-	-	-	-	64.0	-	-
Permanent Labor - Irrigation	8.0	-	-	15	120.0	15	120.0	-	-	-	-	240.0	-	-
Plant Protection Foreman	16.0	-	-	1	16.0	1	16.0	-	-	-	-	32.0	-	-
Permanent Labor - Plant Protection	8.0	-	-	6	48.0	6	48.0	-	-	-	-	96.0	-	-
Farm Machinery Foreman	16.0	-	-	1	16.0	1	16.0	-	-	-	-	32.0	-	-
Driver	9.0	-	-	7	63.0	7	63.0	-	-	-	-	126.0	-	-
Temporary Labor (So.Sh.15/man day)	-	-	-	Sum	97.5	Sum	195.0	-	-	-	-	292.5	-	-
Sub-Total			94.0		489.5		831.0					1,410.5	-	-
Other Operating Costs (DSF)														
4-Wheel Drive	42.0	1	42.0	3	126.0	3	126.0	3	126.0	4	168.0	588.0	90	530.0
Truck-Tipper	30.0	-	-	1	30.0	1	30.0	1	30.0	1	30.0	120.0	90	108.0
Tractor 65-70 hp	15.0	-	-	3	45.0	3	45.0	3	45.0	3	45.0	180.0	90	162.0
Tractor - 100-120 hp	25.0	-	-	2	50.0	2	50.0	2	50.0	2	50.0	200.0	90	180.0
Combine	25.0	-	-	2	50.0	2	50.0	2	50.0	2	50.0	200.0	90	180.0
Maintenance of Ag. Machinery	-	-	-	-	-	Sum	200.0	Sum	200.0	Sum	200.0	600.0	90	540.0
Inputs for DSF	-	-	-	Sum	100.0	Sum	200.0	Sum	300.0	-	-	600.0	75	450.0
Rent for Housing	-	Sum	100.0	-	-	-	-	-	-	-	-	100.0	-	-
Tractor Dozer Operating Costs	30.0	-	-	1	30.0	1	30.0	1	30.0	1	30.0	120.0	90	108.0
Building Maintenance	-	Sum	20.0	Sum	60.0	Sum	70.0	Sum	70.0	Sum	70.0	290.0	45	131.0
Irrigation Structure Maintenance	-	Sum	20.0	Sum	60.0	Sum	70.0	Sum	70.0	Sum	70.0	290.0	45	131.0
Sub-Total			182.0		551.0		871.0		971.0		713.0	3,288.0	77	2 520.0
Total Base Costs			2,717.9		25 837.2		8,295.9		1,711.5		1,208.8	43,433.3	54	23 240.0
Physical Contingencies			540.0		2,500.0		720.0		140.0		160.0	4,060.0	54	2.190.0
Price Contingencies			530.0		4 650.0		2.170.0		440.0		700.0	8 400.0	54	4 584.6
Total Costs (So.Sh. 000)			6 787.5		32.987.2		11 175.9		2,291.5		2 068.3	55 893.3	54	30.319.0
Total Costs (US$ 000)			1 074.0		5.230.0		1.773.0		363.0		440.0	8 880.0	54	4.795.0

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1/ See detailed Cost Tables in Implementation Volume.
2/ ETC's at Bonka and Jazzala are part of WES. See details in Cost Tables in Implementation Volume.
3/ Local Salaries and Wages would be financed by ADF for the first three years only.

TABLE 14

[illegible]

AGRICULTURAL EXTENSION AND FARM MANAGEMENT TRAINING PROJECT

Project Financing 1/ - [illegible]
(Eth. Br.'000)

	Unit Costs	Year 1		Year 2		Year 3		Year 4		Year 5		Total Costs	Foreign Exchange %	Foreign Exchange Total
Civil Works														
[illegible]														
Housing														
Type A	234.0	-	-	8	468.0	-	-	-	-	-	-	468.0	45	210.6
Type B	94.5	-	-	7	661.5	3	283.5	-	-	-	-	945.0	45	425.3
Type C	60.8	-	-	6	364.8	3	182.4	-	-	-	-	547.2	45	246.3
Type D	3.0	-	-	17	51.0	27	81.0	-	-	-	-	132.0	20	26.4
Office Space (m^2)	1.35	-	-	360	468.0	275	371.0	-	-	-	-	839.3	45	389.8
Conference Room (m^2)	1.35	-	-	150	202.5	-	-	-	-	-	-	202.5	45	91.2
Gen Shed (m^2)	0.5	-	-	100	50.0	100	50.0	-	-	-	-	100.0	45	45.0
Water Catchment, Storage, Reticulation	-	-	-	Sum	315.0	Sum	315.00	-	-	-	-	630.0	45	283.5
Sub-Total	-				2,380.8		1,283.2					3,664.0	45	1,714.1
[illegible]														
Housing														
Type A	234.0	-	-	8	1,872.0	-	-	-	-	-	-	1,872.0	45	842.4
Type B	94.5	-	-	10	945.0	7	661.5	-	-	-	-	1,606.5	45	722.9
Type C	60.8	-	-	1	60.8	-	-	-	-	-	-	60.8	45	27.4
Type D	3.0	-	-	47	141.0	-	-	-	-	-	-	141.0	20	28.2
Library (m^2)	1.35	-	-	75	101.3	-	-	-	-	-	-	101.3	45	45.6
Classrooms (m^2)	1.35	-	-	336	453.6	-	-	-	-	-	-	453.6	45	204.1
Lecture Hall (m^2)	1.35	-	-	128	172.8	-	-	-	-	-	-	172.8	45	77.8
Offices (m^2)	1.35	-	-	825	1,113.8	-	-	-	-	-	-	1,113.8	45	501.2
Dormitories (m^2)	1.35	-	-	225	303.8	-	-	-	-	-	-	303.8	45	136.7
Workshop (m^2)	1.35	-	-	200	270.0	-	-	-	-	-	-	270.0	45	121.5
Kitchen (m^2)	1.35	-	-	60	81.0	-	-	-	-	-	-	81.0	45	36.5
Toilet Facilities (m^2)	1.35	-	-	30	40.5	-	-	-	-	-	-	40.5	45	18.2
Laundry Facilities (m^2)	1.35	-	-	50	67.5	-	-	-	-	-	-	67.5	45	30.4
Dining Facilities (m^2)	1.35	-	-	180	243.0	-	-	-	-	-	-	243.0	45	109.3
Animal Sheds (m^2)	1.0	-	-	100	100.0	-	-	-	-	-	-	100.0	45	45.0
Open Sheds (m^2)	0.5	-	-	200	100.0	-	-	-	-	-	-	100.0	45	45.0
60 ha Farm - Land Preparation		Sum	832.0	-	-	-	-	-	-	-	-	832.0	45	374.4
Storage Facilities - 60 ha Farm		-	-	Sum	50.0	-	-	-	-	-	-	50.0	45	22.5
Well and Piping	-	1	360.0	-	-	-	-	-	-	-	-	360.0	45	162.0
Water Catchment, Storage, Reticulation	-	-	-	Sum	315.0	Sum	315.0	-	-	-	-	630.0	45	283.5
Sub-Total			1,192.0		6,431.1		976.5					8,599.6	45	3,834.6
[illegible]														
Headquarters Level														
Housing														
Type A	234.0	3	702.0	1	234.0	-	-	-	-	-	-	936.0	45	421.2
Type B	94.5	7	661.5	2	189.0	-	-	-	-	-	-	850.5	45	382.7
Type C	60.8	-	-	1	60.8	6	364.8	-	-	-	-	425.6	45	191.5
Type D	3.0	4	12.0	2	6.0	9	27.0	-	-	-	-	45.0	20	9.0
Offices	1.35	-	-	675	911.3	-	-	-	-	-	-	911.3	45	410.0
Photo Lab	1.35	-	-	50	67.5	-	-	-	-	-	-	67.5	45	30.4
Printing Room	1.35	-	-	100	135.0	-	-	-	-	-	-	135.0	45	60.8
Water Catchment, Storage, Reticulation	-	-	-	Sum	315.0	Sum	315.0	-	-	-	-	630.0	45	283.5
Regional Level														
Housing														
Type B	94.5	-	-	6	567.0	-	-	3	283.5	-	-	850.5	45	382.7
Type C	60.8	-	-	9	547.2	13	790.4	-	-	6	364.8	1,702.4	45	766.1
Type D	3.0	31	93.0	39	117.0	17	51.0	69	207.0	163	489.0	957.0	45	430.7
Offices (m^2)	1.35	-	-	200	270.0	100	135.0	-	-	-	-	405.0	45	182.3
Bonka ETC 2/	-	-	-	Sum	1,798.0	Sum	315.0	-	-	-	-	2,113.0	43	917.1
Jammale ETC 2/	-	-	-	Sum	1,873.6	Sum	315.0	-	-	-	-	2,188.6	45	973.6
Water Catchment, Storage, Reticulation	-	-	-	Sum	315.0	Sum	315.0	-	-	-	-	630.0	45	283.5
Sub-Total			1,468.5		7,606.4		2,628.2		490.5		853.8	12,847.4	45	5,725.1
FMAS														
Headquarters														
Housing														
Type A	234.0	-	-	2	468.0	-	-	-	-	-	-	468.0	45	211.0
Type B	94.5	-	-	4	378.0	-	-	-	-	-	-	378.0	45	170.1
Type D	3.0	-	-	4	12.0	-	-	-	-	-	-	12.0	20	2.4
Offices (m^2)	1.35	-	-	200	270.0	-	-	-	-	-	-	270.0	45	121.5
Water Catchment, Storage, Reticulation	-	-	-	Sum	315.0	Sum	315.0	-	-	-	-	630.0	45	283.5
Demonstration State Farm														
Housing														
Type A	234.0	1	234.0	-	-	-	-	-	-	-	-	234.0	45	105.3
Type B	94.5	2	189.0	1	94.5	-	-	-	-	-	-	283.5	45	127.5
Type C	60.8	-	-	10	608.0	-	-	-	-	-	-	608.0	45	273.6
Type D	3.0	2	6.0	41	123.0	2	6.0	-	-	-	-	135.0	20	27.0
Offices (m^2)	1.35	-	-	160	216.0	-	-	-	-	-	-	216.0	45	97.2
Open Sheds (m^2)	0.5	-	-	300	150.0	-	-	-	-	-	-	150.0	45	67.5
Storage for Inputs and Output (m^2)	1.0	-	-	150	150.0	-	-	-	-	-	-	150.0	45	67.5
Workshop (m^2)	1.35	-	-	100	135.0	-	-	-	-	-	-	135.0	45	60.8
Shed (Crop Drying)	0.5	-	-	300	150.0	-	-	-	-	-	-	150.0	45	67.5
Irrigation Works 2/	-	Sum	2,000	Sum	2,000.0	Sum	800.0	-	-	-	-	4,800.0	75	3,600.0
Water Catchment, Storage, Reticulation	-	-	-	Sum	315.0	Sum	315.0	-	-	-	-	630.0	45	283.5
Sub-Total			2,489.0		5,384.5		1,436.0					9,249.5	70	5,565.7
Consultancy Services for Supervision of Civil Works	-	Sum	250.0	Sum	250.0	Sum	250.0	Sum	250.0	Sum	250.0	1,250.0	100	1,250.0

TABLE 15

SOMALIA

AGRICULTURAL EXTENSION AND FARM MANAGEMENT TRAINING PROJECT

Project Financing 1/

EEC

(So. Sh. '000)

	Year 1	Year 2	Year 3	Year 4	Year 5	Total Costs	Foreign Exchange %	Foreign Exchange Total
Vehicles and Equipment	1,799.0	1,295.0	-	-	-	3,094.0	90	2,784.0
Technical Assistance	2,300.0	2,300.0	-	-	-	4,600.0	100	4,600.0
Other Operating Costs	220.0	220.0	-	-	-	440.0	90	396.0
Total Base Costs	4,319.0	3,815.0	-	-	-	8,134.0	96	7,780.5
Physical Contingencies	260.0	120.0	-	-	-	380.0	96	365.0
Price Contingencies	330.0	610.0	-	-	-	940.0	96	902.0
Total Costs (So. Sh'000)	4,909.0	4,545.0	-	-	-	9,454.0	96	9,047.5
Total Costs (US$'000)	779.0	721.0	-	-	-	1,500.0	96	1,440.0

1/ For details see cost table in Implementation Volume

January 22, 1979

Table 16

SOMALIA

AGRICULTURAL EXTENSION AND FARM MANAGEMENT TRAINING PROJECT

Government Cash Flow
(So. Sh. 000)

ITEM	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
Cash Inflow															
Credit	10,940	42,119	48,280	31,481	31,866	17,486	-		-	-	-	-	-	-	-
Tax Revenues 1/	319	623	843	1,077	1,453	1,453	1,453	1,453	1,453	1,453	1,453	1,453	1,453	1,453	1,453
DSV Sales	-	495	1,230	2,610	3,080	3,860	3,930	4,010	4,090	4,060	4,520	4,550	5,280	5,280	5,280
Total Inflow	11,259	43,237	50,353	35,168	36,399	22,799	5,383	5,463	5,483	5,513	5,973	6,003	6,733	6,733	6,733
Cash Outflow															
Project Costs	22,892	64,499	38,558	34,719	42,969	28,700	28,700	28,700	28,700	28,700	28,700	28,700	28,700	28,700	28,700
Credit Service Charge 2/	82	398	760	996	1,235	1,366	1,366	1,366	1,366	1,366	1,352	1,338	1,324	1,310	1,296
Repayment of Principal 3/	-	-	-	-	-	-	-	-	-	-	1,822	1,822	1,822	1,822	1,822
Import Subsidy 4/	(136)	(285)	(550)	(2,435)	(3,224)	(5,883)	(8,916)	(10,523)	(14,014)	(17,225)	(21,952)	(28,083)	(35,659)	(41,235)	(52,663)
Total Outflow	22,838	64,612	38,768	33,280	40,980	24,183	21,850	19,543	16,052	12,841	9,922	3,857	(2,813)	(9,403)	(20,825)
Net Cash Inflow/(Outflow)	(11,579)	(21,375)	11,585	1,888	(4,581)	(1,384)	(16,467)	(14,080)	(10,569)	(7,328)	(3,949)	2,146	9,546	16,136	27,558
Cumulative	(11,579)	(32,954)	(21,369)	(19,481)	(24,062)	(25,446)	(41,913)	(55,993)	(66,562)	(73,890)	(77,839)	(75,693)	(66,147)	(50,011)	(22,453)

1/ Income tax on local salaries and wages at the average rate of 12.5 % of gross salary.
2/ 3/5% per year over 50 years.
3/ Over 50 years with 10 year grace period.
4/ Decreased food import subsidies due to increased local production at the rate of So.Sh. 320 per ton.

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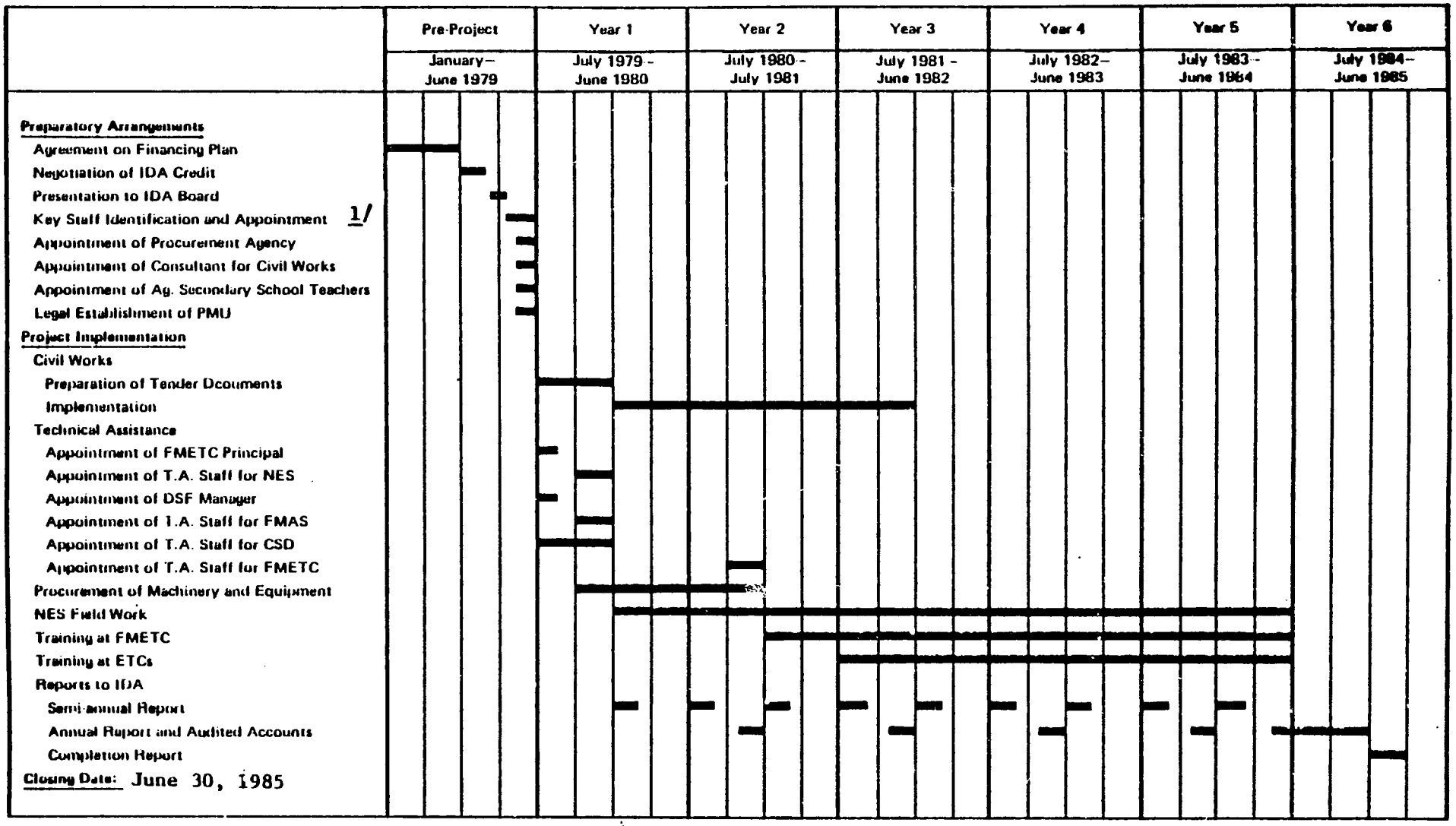
ANNEX 13

SOMALIA
AGRICULTURAL EXTENSION AND FARM MANAGEMENT TRAINING PROJECT
Implementation Schedule



1/ Project Technical Manager, Financial Controller, Project Director.

World Bank – 19980

ANNEX 14

SOMALIA

Agricultural Extension and Farm Management Training Project:

Coordination Meeting Between

Representatives of Somali Government, the International Development Association, the United States Agency for International Development and the African Development Fund.

AIDE MEMOIRE

The views in this aide memoire are those of the participants and not necessarily of the Agencies Concerned.

Mogadishu May 3, 1979

Agricultural Extension And Farm Management Training Project

A coordination meeting for the implementation of the Agricultural Extension and Farm Management Training Project was held in Mogadishu on May 3, 1979. Represented were the Government of Somalia (GOS), the African Development Fund (AFDF), the United States Agency for International Development (USAID) and the International Development Association (IDA). The meeting was chaired by Mr. Ahmed Mohamed Mohamoud, Chairman of the Economic Committee. The Agenda of the meeting and a list of those present are attached as appendices 1 and 2 to this aide-memoire. Agreement was reached on the following major points:

1. Project Concept:

All present agreed to the Project Concept as presented in the IDA Staff Appraisal Report.

2. Project Components

(a) Farm Management and Extension Training (FMETC): to be built at Afgoi to provide practical pre-service training for regional and district level extension staff and farm managers, assistant managers and field managers for state and cooperative farms and for agricultural development projects. The FMETC would include a 60 ha Training Farm;

(b) National Extension Service (NES): to be strengthened through establishment of National Extension Headquarters at Afgoi, the upgrading of two Extension Training Centers (one at Bonka and one at Jannale) to train Field Extension Agents and the introduction of an Extension Methodology with emphasis on continuous training given to extension personnel and regular contact with farmers;

(c) Farm Management Advisory Service (FMAS) : to be established at Afgoi, initially to provide feed back up to existing and newly trained farm managers and advise government on large scale farming and related issues and, ultimately acquire; an extension function and become a branch of the National Extension Service. The FMAS would have a 400 ha Demonstration State Farm at Jannale and would have access to the two other existing state farms at Jannale to upgrade their management.

(d) Training abroad to include:-

(i) post-graduate training abroad for 38 faculty of agriculture graduates

(ii) study trips for 52 district extension officers and six senior Extension and farm management personnel and

(iii) field visits for six senior staff of the Ministry of Agriculture at the director level and above.

(e) Master Plan for strengthening the National Agricultural Research System and its links with extension. This Master Plan would be the basis for developing research programs for later implementation.

(f) Project Management Unit to implement the project and monitor its progress on behalf of the Ministry of Agriculture.

(g) Assistance to the Agricultural Secondary School and the Central Statistical Department in the State Planning Commission

3. Organization and Management

The PMU would be established at Afgoi. It would consist of a Somali Project Director who would be assisted by an internationally recruited Project Technical Manager and a Financial Controller. All internationally recruited personnel would be responsible to the Project Director through the Project Technical Manager. The teaching staff at the FMETC would be responsible to the FMETC principal who, in turn, would be responsible to the Project Director through the Project Technical Manager. The Extension personnel at the NES headquarters would be responsible to the Technical Director NES who, in turn, would be responsible to the Project Director through the Project Technical Manager. The FMAS personnel would be responsible to the FMAS head who, in turn, would be responsible to the Project Director through the Project Technical Manager.

Cooperation between Project supported Agencies and other training, research and Government Agencies is built into the system. A major responsibility of the PMU would be to foster such cooperation and make maximum use of it to ensure optimum use of available resources and maximum spread of potential benefits.

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4. Project Financing

The Project would be financed by GOS, USAID, AFDF, EEC Special Action Fund and IDA. Items to be financed from non Government sources are listed in Tables attached as Annex 1 Government would finance the balance of local expenditures. Representatives of both USAID and AFDF reiterated that commitment of their respective institutions to financing the items listed in the following tables. The USAID grant is likely to get final approval in August while the ADF credit was already approved.

5. Project Implementation

(a) Pre-effectiveness stage

(i) Between now and the time the Project becomes effective (September, 1979)

Government would:

- Make the 60 ha Training Farm at Afgoi part of the FMETC, the 400 ha Demonstration State Farm in Jannale part of FMAS and reserve the other two State Farms in Jannale for use by FMAS during the five year project investment period;

- Establish officially the PMU through publication of a decree,
- Appoint the project director, the project technical manager and the financial controller to the PMU. The latter two positions would be filled through ADS arrangement;
- Appoint a procurement consultant to help PMU organize its procurement in general and a consultant to help with the preparation of tender documents for civil works and at a later stage with the supervision of construction;
- Open a Project Account and deposit So. Sh. 3 million in it as the initial payment;

(ii) Government would reach agreements with USAID, expected in Mid-August, 1979

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(iii) Co-financiers would finalize their Project documents and negotiate them , expected in Mid August;

(iv) Government would arrange temporary housing for PMU staff and for the Manager of the DSF.

(b) Critical Steps in Project Implementation

September, 1979	: PMU senior staff on board GOS/IDA DSF Manager on board GOS/IDA
August- September, 1979	: PMU appoint consultants for preparation of tender documents and supervision of civil works. Government would advance funds if this were to happen before effectiveness GOS/ADF/IDA
October, 1979	: Terms of Reference for preparation of Research Strategy approved GOS/IDA/USAID
November, 1979	: Preparation for procurement of machinery and equipment for DSF GOS/ADF
December, 1979	: Preparation for procurement of vehicles, equipment and supplies for FMETC, NES, FMAS, ETCs GOS/USAID/IDA/ADF
December , 1979	: Principal FMETC on board GOS/USAID
December, 1979	: Procurement vehicles and equipment for NES GOS/USAID
January , 1980	: Bid evaluation and contract award for civil works GOS/ADF
January, 1980	: Housing accommodations arranged for NES and FMAS senior staff GOS

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January , 1980	: Research Strategy mission in field	GOS/USAID
February, 1980	: NES personnel on board	GOS/USAID
	FMAS personnel on board	GOS/IDA
April - May, 1980	: Training program for Somali personnel submitted by PMU for approval	GOS/USAID/IDA/ADF
May, 1980	: Start of civil works at Afgoi (FMETC, NES, FMAS), Jannale (DSF, ETC) and Bonka (ETC)	GOS/ADF
September, 1980	: Research Strategy report submitted for review	GOS/USAID/IDA/ADF
January 1981	: FMETC staff on board	GOS/USAID

6. Consultation among Co-financiers.

All present agreed in principle to the content of the draft memoranda of understanding attached as appendices 3 and 4 to this aid-memoire.

7. Recruitment of Technical Assistance Personnel

Government renewed its request for IDA to assist in recruiting the Project Technical Manager and the Financial Controller under ADS arrangement. They expressed preference for receiving CVs on as many potential candidates as possible. USAID promised to try to help by identifying some potentially suitable candidates. Government also asked for assistance in identifying potential candidates for the other technical assistance positions for direct GOS recruitment.

Concerning consultancy services for helping PMU with procurement matters and supervision of civil works, it was agreed that, if necessary, Government would advance foreign exchange funds to allow PMU to acquire the services of such consultants one or two months prior to effectiveness.

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8. Reporting System

It was agreed that procedures for establishing a project reporting system that meets the needs of all parties would be established during the first joint supervision mission. The timing of such mission was set for early October shortly after Project effectiveness. All parties stressed the need for coordination and for agreeing far enough in advance on timing of supervision missions to allow for participation of all institutions. The first supervision mission would concentrate on procurement matters, including recruitment of staff, on the establishment of a reporting system and on the planning of construction program and the start up of extension program.

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ANNEX 15

INITIAL ENVIRONMENTAL EXAMINATION

Project Location:	Somalia
Project Title:	Agricultural Delivery Systems
Project Number:	649 - 0112
Funding (Fiscal Year and Amount):	1980 $1,500,000 Total $7,752,000
Life of Project:	5 Years
IEE Prepared By:	Mission/McGowan Date: Dec 17, 197[illegible]

Environmental Action Recommended:

A negative determination is recommended.

Concurrance: Charles P. Campbell Date: 12/15/7[illegible]

Assistant Administrator's/Director's Decision: Date:

I. PROJECT DESCRIPTION

A.I.D. will participate as a major donor in a multidonor project designed to upgrade agricultural management, extension, and training as well as allied infrastructure, including agricultural research in Somalia. Principal project inputs will include technical assistance, formal and non-formal education, and the provision of teaching and support equipment.

Specifics include: 1) strengthening of the National Extension Service through training and introduction of new extension emphasis, 2) creation and operation of a Farm Management and Extension Training Center to produce practically oriented management and extension personnel, and 3) quantify, coordinate, and strengthen the national agricultural research strategy.

II. ENVIRONMENTAL CONSIDERATIONS

Land Use

The principal thrust of the project is the extension of agricultural information and practices into both the rainfed and irrigated areas of Somalia. Through the project's influence, there will be an increase in the intensity of agriculture production and thereby also in allied systems. Thus it is expected that shifts will occur in types of production creating an expansion of land under till. Such shifts and expansions will, in some part, be an indication of project success.

Through training received in the project, extnesion agents and managers will be able to intelligently guide expansion and control agricultural land use shifts. The project should consider some land use planning in the curricula, especially as it may relate to an urban/agricultural/pastoral mix. Extension agents and farm managers have a unique chance to avoid many mistakes as they open new areas.

Increasing the Population

The project is expected to have no immediate effect on population. Long term effects from the project may result in some population shifts as new areas are farmed. The eventual increase in production and reduction in the risk avoidance posture will be seen as an increase in the health and welfare of the recipients. This in turn will affect their decision with respect to family planning.

Extracting Natural Resource

As information is developed and disseminated, and cropping patterns change, there will be a need for the replacement of soil nutrients The project intends to provide a sensitivity for such issues and as a consequence there should be no serious environmental problem.

Changing the Soil Character

The extension of management and technique will aid in returning the soil to a better agricultural state. Thus, the program will have a beneficial affect on this point.

Altering Natural Defenses

As with any other trend toward a mono culture, there are certain inherent problems. Nonetheless, with proper management and extension as per the program design, such can be minimized. The system would probably deteriorate rapidly without inputs arising from proper management and extension.

Foreclosing Important Uses

The project's results should be seen in a reduction of such foreclosure.

Jeopardizing Man or His Works

Extension of proper information, based on sound training, as utilized by good management will be principles in eliminating such jeopardy - the project is designed in this way.

Water Quality

The use of water and the timing of crops are principal inputs to agricultural success and are issues to be covered in the training programs. Water quality in relation to rainfed lands relates to runoff. Water quality in irrigated agriculture is particularly affected by dissolved solids in both headgate and tail waters. The provision of soil and water conservation, as proper management tools, is expected to reduce both point and nonpoint source pollution. The salinity of water and its consequent affect on soils will be considered in the training programs. Use of agricultural chemicals, and the training preceeding such, must evaluate the various systems to assure adequate assimilation capacities

and any tendencies for pollution. The training programs will consider these problems and thereby instill within its students a sensitivity which may then be extended.

Atmosphere

Within the confines of an agricultural training and institutional setting there will be no excessive or adverse affect on the atmosphere. The program will instill in its students an appreciation of the various forms and causes of atmohpheric pollution arising from agricultural production, such as burning, dust, vaporization of pesticides, etc.

Cultural

Because the thrust of the project is to enhance the ability of the country to produce within the confines of low risk inputs, there should be no adverse cultural affect.

Natural Resources

Through the increased efficiency in utilization of water, some water otherwise lost to the surface drainage systems will be salvaged. This should substantially increase infiltration and reduce the silt load currently affecting both major drainage systems.

Scarce resources will be better utilized through more efficient cropping, harvesting, and storage systems. As efficiency increases, there should be a tendency to lessen encroachment into less satisfactory areas of the environment. This will be accomplished through an active extension and research program coupled with good management.

Socioeconomic

The program, per its design, will provide systems whereby some of the less desirable cultural traditions are replaced. The resultant product will be seen in an overall socioeconomic improvement.

Health

Much of the potential for agricultural production is lost because of inefficiency, lack of knowledge, or poor management capability. The program will provide mechanisms whereby these problems can be resolved. With greater production, many of the problems associated with low income and poor nutrition will be resolved.

Ultimately, as production intensifies, there will follow a need for such sophisticated tools as agricultural chemicals. The training components need to be cognizant of the ramifications which attend these tools. It is thereby recommended that the plant protection expert have the following qualifications: 1) Knowledge of human toxicological behaviours of agricultural chemicals in arid conditions, 2) be well versed in the practical aspects of workers' safety, 3) be capable of establishing or evaluating the appropriateness of medical controls for persons using or extending information on organo phosphates, carbamates, and some of the other more toxic materials including certain herbicides, 4) be knowledgeable about the environmental fate of the materials and their breakdown products, and 5) be aware of the affects of these tools on wildlife, non-target organisms and systems, including the tendencies to produce an increased rate of resistance in disease vectors.

General

Any international impact should be seen in the eventual move toward self-sufficiency in grain and other crop production. There are no controversial impacts of significance. Larger program impacts may accrue to the tie-in with other agriculturally related projects. This would be positive.

III. ENVIRONMENTAL RECOMMENDATION

The project per its design is intended to mitigate current environmentally questionable practices, to upgrade knowledge and management, and boost the economy. These are all beneficial and as such an Environmental Assessment is not recommended. Nonetheless, a competent environmental analysis should be undertaken of the curricula when it is being developed to assure consideration of concerns.

IMPACT IDENTIFICATION AND EVALUATION FORM

Impact Areas and Sub-areas 1/	Impact Identification and Evaluation 2/
A. LAND USE	
1. Changing the character of the land through:	
a. Increasing the population	M
b. Extracting natural resources	L
c. Land clearing	M
d. Changing soil character	M
2. Altering natural defenses	M
3. Foreclosing important uses	L
4. Jeopardizing man or his works	L
5. Other factors	
_____	_____
_____	_____
B. WATER QUALITY	
1. Physical state of water	M
2. Chemical and biological states	M
3. Ecological balance	M
4. Other factors	
_____	_____
_____	_____

1/ See Explanatory Notes for this form.

2/ Use the following symbols:
N - No environmental impact
L - Little environmental impact
M - Moderate environmental impact
H - High environmental impact
U - Unknown environmental impact

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C. ATMOSPHERIC

1. Air conditions ---------- L-M
2. Air pollution ---------- L-M
3. Noise pollution ---------- L
4. Other factors

_____ _____

_____ _____

D. NATURAL RESOURCES

1. Diversion, altered use of water ---------- M
2. Irreversible, inefficient commitments ---------- L
3. Other factors

_____ _____

_____ _____

E. CULTURAL

1. Altering physical symbols ---------- M
2. Dilution of cultural traditions ---------- L-M
3. Other factors

_____ _____

_____ _____

F. SOCIOECONOMIC

1. Changes in economic/employment patterns ---------- M
2. Changes in population ---------- M
3. Changes in cultural patterns ---------- M
4. Other factors

_____ _____

_____ _____

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G. HEALTH

1. Changing a natural environment ———— M
2. Eliminating an ecosystem element ———— L
3. Other factors

———— ————

———— ————

H. GENERAL

1. International impacts ———— M
2. Controversial impacts ———— L
3. Larger program impacts ———— M
4. Other factors

———— ————

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I. OTHER POSSIBLE IMPACTS (not listed above)

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* See attached Discussion of Impacts.