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PROJECT 279-0052

AGRICULTURAL DEVELOPMENT SUPPORT

FOR THE

YEMEN ARAB REPUBLIC

INDIVIDUAL REPORTS

OF

DESIGN TEAM MEMBERS

CONTRACT NO.

AID/NE-C-1613

CONSORTIUM FOR INTERNATIONAL DEVELOPMENT

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INDIVIDUAL TEAM MEMBERS' REPORTS

- A. Preface
- B. Report of the Soil Scientist
- C. Report of the Agronomist
- D. Report of the Program Director
- E. Report of the Design Team Leader
- F. Report of the Extension Specialist
- G. Report of the Agricultural Economist
- H. Report of the Agricultural Education Specialist
- I. Report of the Ibb/ATC Project Director
- J. Report of the Social Scientist
- K. Report of the Agricultural Engineer
- L. Report of the Range Management Specialist
- M. Report of the Agricultural Cooperative/Credit Specialist
- N. Editor's Note
- O. Summary Record of Orientation Session
- P. Summary Record of Final Design Team Meeting

PREFACE

From June 1979 to August 1979, the Consortium for International Development (CID) fielded an expert team in the Yemen Arab Republic. The Design Team's objective was to prepare a Core Project Paper for consideration by the U. S. Agency for International Development Mission in Yemen and the Yemen Government. The Core Project Paper laid out a proposed strategy for agricultural development for Yemen and is published under separate cover.

This report contains individual papers prepared by the various team members and is reproduced here for future reference for individuals who may wish additional details not contained in the Core Project Paper. The views and comments expressed are those of the individual team members and do not necessarily reflect those of the Design Team as a whole or CID.

SECTION B
INDIVIDUAL TEAM MEMBER REPORT

TITLE XII - REPORT

BY

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SOIL SCIENTIST

Y.A.R. July 1979

Table of Contents

	<u>Page</u>
THE SOILS OF YEMEN ARAB REPUBLIC	
I. Topography and Land Resources	1
II. Soil Survey	1
1. Soils of the Mountain Terraces	3
2. Soils of the Intermontane plains and other Fluviatiles Valleys	4
3. Soils of the Tihama Plain	5
AGRICULTURE DEVELOPMENT ORGANIZATIONS IN Y.A.R.	
1. Southern Uplands Rural Development Project (SURD-P)	7
2. Tihama Development Authority	9
3. Central Agricultural Research and Training Organization (CARTO)	12
SOIL FERTILITY AND FERTILIZERS	14
WATER AND SALINITY	20
GENERAL CONCLUSIONS AND RECOMMENDATIONS	22

THE SOILS OF YEMEN ARAB REPUBLIC

To better serve the purposes of this report, a brief description of the soils of Yemen is necessary. Most of the descriptive information presented in this report has been gathered from diverse publications cited as references. Some, however, is based on personal observations during travel about Yemen.

I. Topography and Land Resources

There is a sizeable collection of map resources available in the country. Although the Central Planning Office in Sana can provide most of these materials, a more complete collection is available at the Ministry of Public Works, thanks to the efforts of Mr. Eric Dawns, who has collected all the maps of Yemen. For the purpose of this project some useful maps have been selected. They are listed in Table 1.

In addition, a team from Cornell University has prepared a project paper for USAID/Sana on the use of Landsat Imagery in the Study of Land Resources and Land Use in the Y.A.R. Their project "Land Classification and Soil Survey" (#279-0042) has been approved and the Cornell University Scientists Team is expected to be in the country by the end of June 1979. The Core Team of the Title XII program should coordinate their work on soils with the Cornell Team.

II. Soil Survey

There is little information available on the description of the soils of Y.A.R. A first report on the soils of the Yemen Highlands was prepared by Smith (1971), FAO consultant. In 1971 TESCO carried out a study on the soils of Wadi Zabid (Tihama Region) under a sub-contract from FAO. Few other relevant reports for the soils of the Tihama Region exist (Ferris 1953, Huntings Technical Services, Ltd., London, 1967). The common limitation of these reports is their lack of laboratory data to support the field description of the soils. Since the creation of the Central Agriculture and Research Organization in Taiz, soil laboratory tests were made possible. A limited number of soil survey reports have been published (see references).

Table 1. Topography and Land Resources Maps of Y.A.R

Type of Map	Scale	Description	Source	Available at
Satellite Image	1:500,000	A set of ERTS images emphasizing geologic information	USAID Mission, Yemen	USAID Sana
Topography	1:250,000	Covers the whole country; Includes basic roads, village names, 4 kinds of land cover and some hydrography	British project 1973	Ministry of Agriculture Sana
Topography	1:50,000	Covers the most developed portions of the country. Excellent source	British Directorate of Overseas surveys 1978	Ministry of Overseas Development Tolworth, England
Aerial Photo	1:60,000	A set of black and white aerial photographs, covering the whole country	British project 1972	Ministry of overseas development Tolworth, England
Air Photo Mosaics	1:25,000	Identifies a limited number of basic land use categories, especially in the areas around Turbah, Wadi Barakani, Hayfan, Dimmah, Taiz	Department of geography University of Zurich	FAO-Rome
Watershed	1:500,000	An overlay of the Satellite imagery showing the major watersheds of the country	USAID	USAID Mission Sana
Geology	1:500,000	Nine separate preliminary geologic maps covering the entire Y.A.R.	U.S. Department of Interior 1976	USDI Geological Survey
Landsat Imagery	1:2,500,000	Soil and land use mapping in the Central Region of the Yemen Arab Republic	UNDP/FAO 1978	UNDP/FAO Sana

The soils of Y.A.R. can be roughly divided into three groups (Smith, 1971; Ferris, 1953; Al Thoor and Dewan 1978).

1. Soils of the mountain terraces.
2. Soils of the inter-montane plains and other fluvial valleys
3. Soils of the Tihama plains

1. Soils of the Mountain Terraces

Their most important feature: moderately well developed profile indicating that they have existed in-situ for a considerable time. Most of these soils are lithosols and yermosols. Yermosols here are mostly lithic and stony because truncation by erosion has gone on more rapidly than soil formation or accumulation.

Classification of the terraces

- a. Calcareous loess-like soils

Occupy extensive area of Turbah, Aussifera, Taiz and Ibb districts

Well drained

Light colored

Calcareous

Silt loam and silty clay loam

- b. Colluvial soils -- Amran, Sana, Al Kaida

Mixture of the loess-like pre-existing materials and the materials formed as a result of weathering and local washing down of the country rock

Moderately deep to very deep

Excessively to well drained

Calcareous

Silt loam to silty clay loam

c. Wadi Soils -- generally very young

Moderately deep to very deep

Mostly well drained

Gravelly and coarse to medium texture

Irrigated by wadi water, gravity channels

Susceptible to flood

d. Hydromorphic soils -- Occur on flat to almost flat landscape along the wadi course

Very deep

Poorly to moderately poorly drained

Some have developed salinity because of the salt accumulation as a result of evaporation of water from the soil surface

The Habil Al-Aswad area, near the Taiz airport, is a typical example of the salt affected hydromorphic soils

2. Soils of the inter-montane plains and other Fluvial Valleys

A great variety of Xerosols, Lithosols, Yermosols and Fluvisols that include some stony and lithic phases. Plateaux elevations range from 1500 to 3,000 meters.

Mountain plains of:

Sadah, Amran, Sana -- North

Mabar, Damar, Yerim, Kitab -- Central

El Janadiyah -- South

The montane plains represent the most important agricultural area in the country especially in the relatively high rainfall areas or where groundwater irrigation resources have been developed and where wadis or spring water is available for perennial irrigation.

Flat to gently sloped soils

Very deep

Well drained

Medium alkaline

Calcareous silt loams to silty clay loams

In some areas poorly drained (hydromorphic soils)

3. Soils of the Tihama Plain

7 Wadis serve this area.

The soils on low Dunes and Sand Sheets are mostly coarse-textured Regosols; gravelly Fluvisols occupy most areas of the southern plains. A variety of Solonchaks occupy a narrow strip along the Red Sea.

The soils of the region may be classified into five main groups (Al-Thoor and Dewan, 1978):

- a. Alluvial-Fan soils
- b. Alluvial-eolian soils
- c. Alluvial soils on the valleys
- d. Saline (1) Coastal
(2) Irrigated area — inland soils
- e. Other (1) Rough broken land
(2) Sand dunes including buried soils

- a. Alluvial -Fan soils in the upper catchments of the main wadis; result from transportation and redeposition of alluvial materials. relatively coarse and medium sized particles
shallow to very deep soils
most soils do not show any profile development; but in some of the deep soils some clay and calcium carbonate accumulation may be observed
These are mostly dry soils. Culture of sorghum and millet is practiced where spring or well water is available.

b. Alluvial -eolian soils

Represent the coarser alluvial material brought down by water from the mountains. They occupy the eastern part of Tihama. Most of these soils are not cultivated except in areas where rainfall allows

the cultivation of sorghum and millet for grazing purposes.

mostly arid soils with excessive infiltration rate

very deep

coarse to medium texture

calcareous

weak to moderate profile development

c. Alluvial soils of the valleys

They are the most predominant soils of the region. Formed as a result of movement and deposition of alluvial materials through plain flood action that takes place annually. They are, therefore, stratified soils, generally young with little or no profile. The alluvial soils of the valleys can be divided into 2 categories: (1) the soils that are affected by spate irrigation are very deep, relatively coarse textured, sandy loam with no profile development, have high levels (earth beds) built around them leaving two openings, one as an inlet and the other as an outlet for water. (2) Soils not affected by spate irrigation are generally very deep, silt loam to fine and sandy loam with weak to moderate profile development.

From the agricultural standpoint, this is the most important group of soils in the Tihama Region. Cultivated lands are irrigated either by wells or by wadi water through a network of irrigation channels or directly by spate irrigation. The common field crops are cotton, sorghum and mazie; also vegetable crops such as onion, tomatoes, egg plants, peppers, watermelon and melon. A local variety of tobacco is grown occasionally on these soils.

d. Saline and/or alkaline soils

Located mainly along the sea coast and to a lesser extent elsewhere in Tihama in areas where poor quality water has been used for irrigation without appropriate water management practices. Two examples of the latter soils are worth mentioning: (1) the Gumaisha area (16 km east of Houaidan, where typical alkalinity pans (mostly caliche) have developed in the medium to coarse texture soil profiles of the experimental farm (2) The Lawia area about 50 km southeast of Houaidan.

The saline and/or alkaline soils of Tihama can be divided into two groups:

(1) The soils near the coast. The land here is not cultivated except in some areas where fairly suitable water is available from the base flow of the wadis, or where date palms are grown.

(2) The inland soils are irrigated with marginally suitable to unsuitable water.

Since leaching requirement and optimum requirement are seldom met, salt-affected soils are extending in area and the severity of the problem in the already salt-affected areas is increasing.

e. Miscellaneous Land types

(1) Rough broken lands -- They represent the severely eroded lands with no soil cover (rock outcrops)

(2) Sand dunes -- large surfaces of this type are in Wadi Siham, Wadi Zabid and Wadi Rasyan areas. These are the desert sand areas with very deep coarse sand profile and are practically bare.

AGRICULTURE DEVELOPMENT ORGANIZATIONS IN YAR

Chart 1 identifies the major Agricultural Development organizations in the YAR.

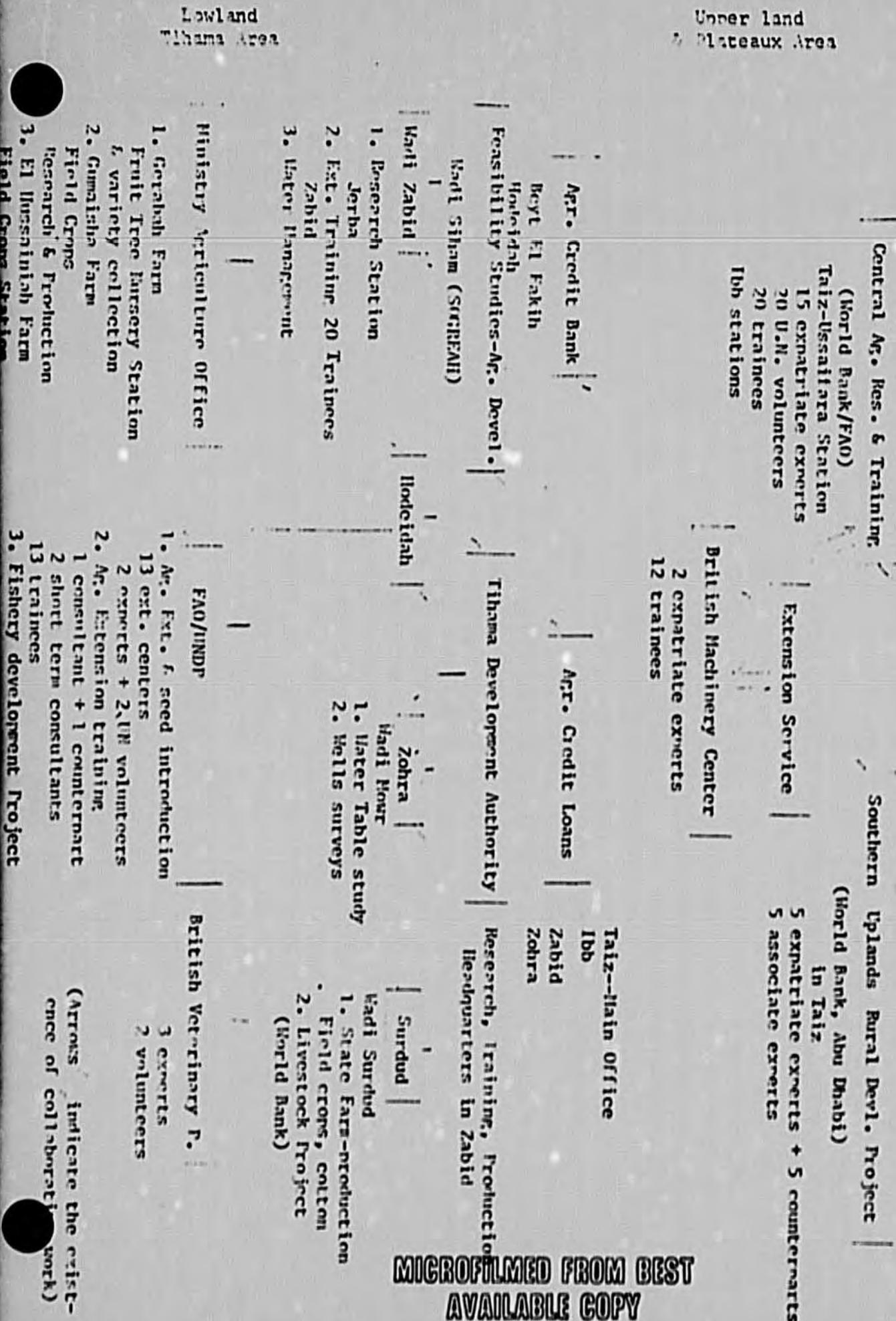
Only the organizations that deal directly or indirectly with soil fertility are described in this report:

1. Southern Uplands Rural Development Project (SURD-P)

When the SURD-P was started it only included a couple of major activities, mainly engineering and agriculture services. As the need arose, new sections were developed in the project. Fields of work at the project are now as follows:

- a. Agriculture production
- b. Extension: plant protection, horticulture, soils, crops
- c. Animal resources: livestock, veterinary
- d. Engineering: roads, land protection, irrigation

Chart 1. Some Major Agriculture Development Organizations in Yemen Arab Republic



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(Arrows indicate the existence of collaborative work)

e. Credit: long term and short-term loans

f: A section on home economics is being included.

The program is under the supervision of a Coordination Committee Board. The project is in its 2nd phase. It was anticipated that by the end of the first phase local staff would have been trained to take on the positions now filled by expatriates. This objective has not been met.

Mr. El Kheir, expatriate Director Manager, pointed out that training of local staff is needed but scholarships for higher education abroad are not always available. He wishes to see Title XII team collaborate with them in

a. Training: both low level and high level training

b. Irrigation and land protection: because of water loss by surface run-off and seepage and because of poor water management there is a shortage of water for optimum agriculture production in the Southern Uplands area. Soil erosion is also a problem in the region.

2. Tihama Development Authority

The Organization started with the Wadi Zabid Development project in 1976. Then in the 1979 Plan it was assigned all agricultural activities in the Tihama Region.

The administration: (see Organization Chart 2)

Chairman and Director General: Mr. Ahmed Ali Hummed

Advisor and Technical Manager: Mr. Hazza

The TDA reports directly to the Minister of Agriculture. There is a Board of Directors. The Organization divides their activities into 4 categories:

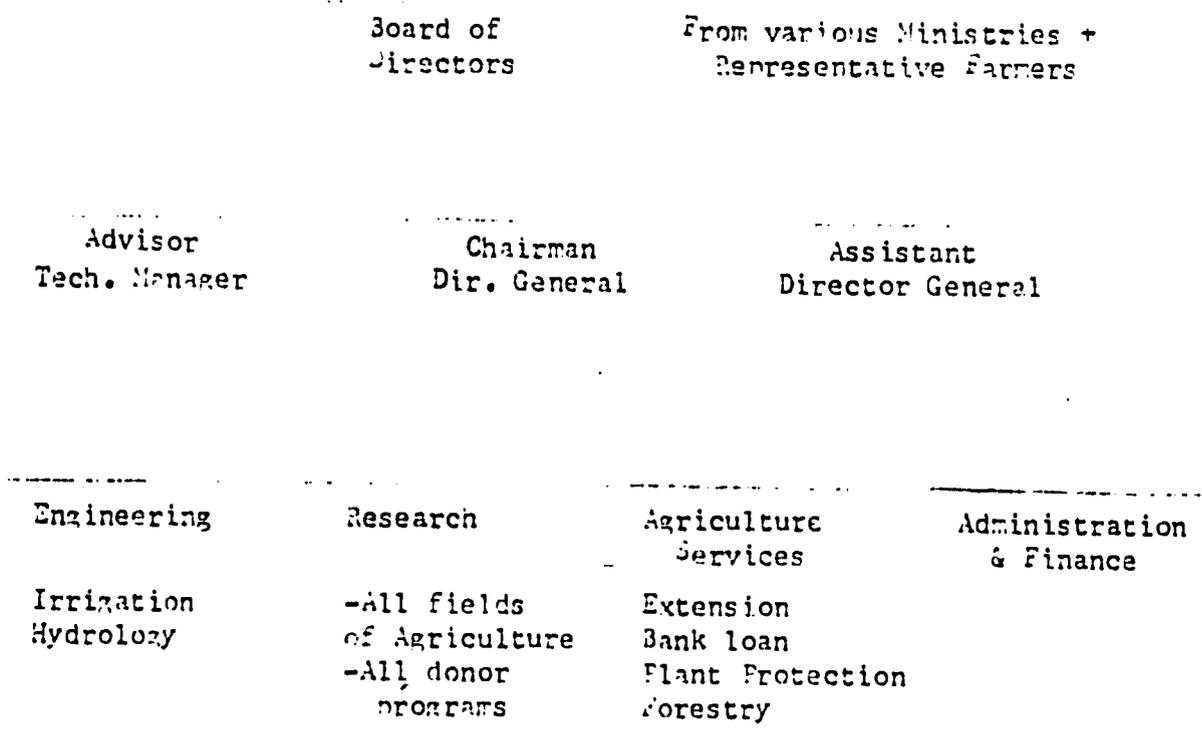
Engineering

Research

Agriculture Services

Administration and Finance

Chart 2. The Tihama Development Authority



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All Donor projects existing in Tihama should report to TDA. The agricultural projects in Tihama are reported elsewhere in this report.

For research carried on in Tihama (1974-1978) see final report (Copy in Title XII file) published by TDA.

Future Research: TDA is coordinating their research program with the Taiz Research Center. It was decided that a Tihama Research Center will be started in Surdud Station financed by IDA and IFAD (World Bank).

3 full time experts in cotton, cereal crops/forage, range management

Part time of other specialities from Central Agricultural Research Center (CARTO), no duplication with CARTO

Assistants and counterparts

The World Bank Office in Washington has a description for future programs "Tihama Development Project 3". CPO, Sana might have a copy.

The actual State Farm of Durdud will be the research station for TDA. It will do all work except what can be done by Taiz. Collaboration and coordination with CARTO will start July 1979.

Planning Management

Technical Advisor	}	Expatriates
Management Advisor		
Finances Expert		
Administration		

Plus in 1980

Agriculture Advisor

Irrigation Advisor

Research Advisor (The Head of Surdud Station)

Surdud Station will have 50 ha for experimental field Substations:

Zabid, Jeruba

Table 2. Recommendations from TDA to the Title XII Team

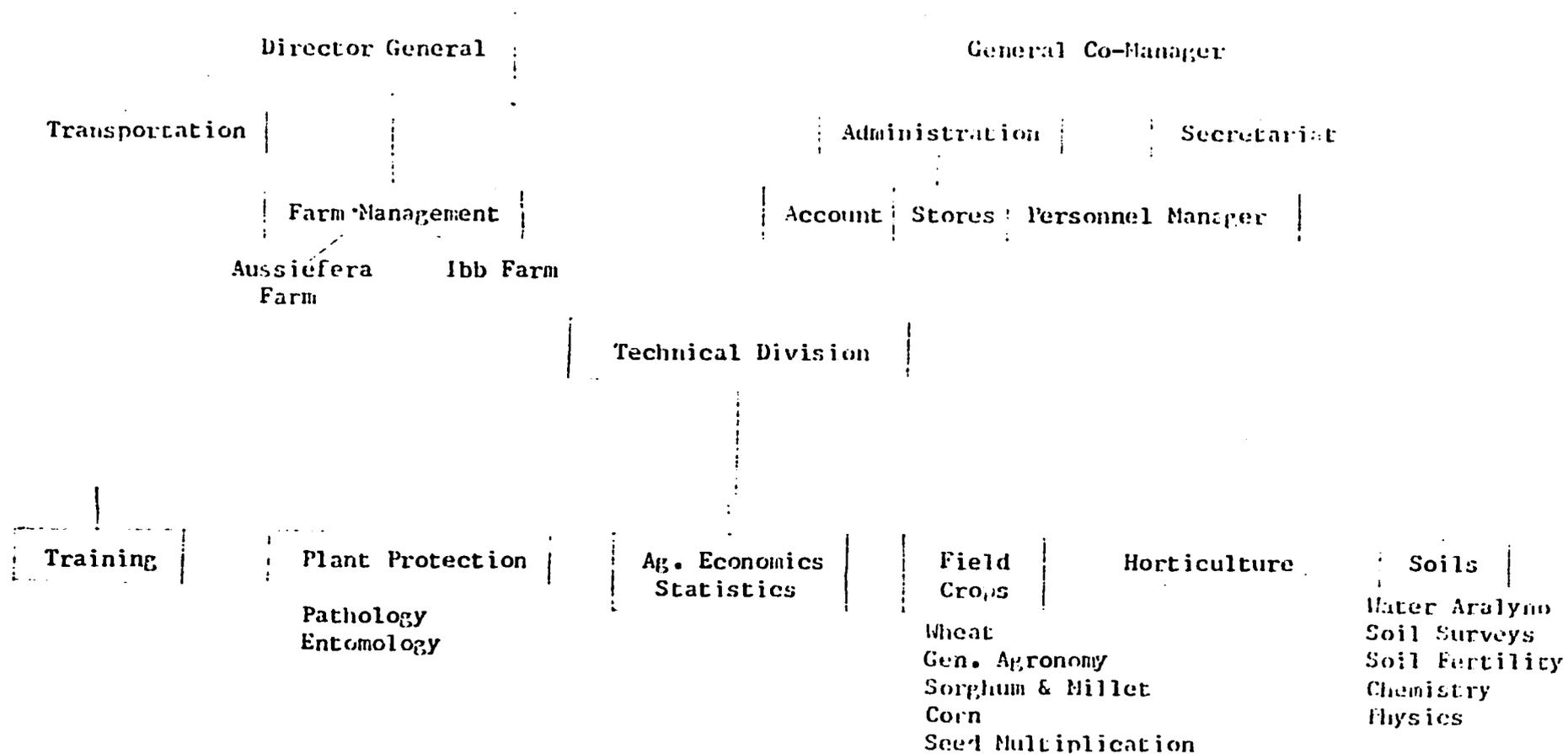
1. Join TDA efforts in soil and water management
 2. Coordinate research work
 3. Avoid duplication of other donor programs
 4. Provide expert in soil fertility with good background in plant physiology and plant nutrition to include plant testing and fertility research
 5. Provide training in agricultural fields and in English language
 6. Look carefully at the labor and salaries situation
 7. Try to find ways to encourage enrollment in the agriculture sector in Tihama. For example, provide special allowances for extension agents in Tihama.
 8. Help start an agriculture sciences library
-

3. The Central Agriculture Research and Training Organization (CARTO) in Taiz started in 1974 as part of a FAO project. The project was designed for a five year period. The first phase is completed and the second phase started in January 79. In 1978 the World Bank took over the sponsorship for the project but staff members are still supplied by the FAO. A general organization chart is found in Chart 3.

Dr. Jamal Fouad, Director General of the project, was not available at the time we visited the Center. Dr. Mustapha Kamal, General Co-manager and his Yemeni counterpart, Mr. Abdulrahman Sallam, were very cooperative.

The Organization, at the present time, has two centers: a main station in Aussiefera in the vicinity of Taiz, and a second station in Ibb. According to Dr. Kamal, there are plans to expand the present centers and for the creation of new local stations all over the country with sources of financing from the World Bank and Abu Dhabi. In addition to the scientists presently serving the Center, a group of experts will be hired to assume positions at the different sections of the Organization. The project will then have a total of 15 expatriate experts:

Chart 3. Central Agricultural Research and Training Organization



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- 1 soil scientist
- 2 horticulturists (1 - vegetables + 1 for fruit trees)
- 3 agronomists (- cotton + 1 - wheat and barley + 1 - sorghum
millet and maize)
- 1 agriculture economist
- 1 plant pathologist
- 1 entomologist
- 1 irrigation expert
- 1 agricultural engineer
- 1 farm management expert
- 2 trainers for extension
- 1 seed multiplication expert

Short term consultants are hired as needed. Dr. Temimi, for example, is actually doing some research on sunflowers. Some preliminary work is being done on weed control. New crops such as chickpeas and sugar beets will be taken care of by different plant scientists. Sugar beets, according to Dr. Kamal, are already being tested.

The Center does not have an Engineering section for the moment but has good coordination with the British Engineering and Machinery project in Taiz. Some responsibility is also shared with the British Agriculture Improvement center in Dhamar especially concerning dryland agriculture and crop rotation. Dr. Kamal feels there is a great need for well trained Yemeni people. CARTO does have a training center aiming to train lab technicians and agriculture extension agents in all fields included in the project but almost 80% of the trainees leave the Center for better paying jobs or for higher education.

SOIL FERTILITY AND FERTILIZERS

Although some soil fertility research programs exist in the country, they are still at the embryonic stage. Perhaps the only organization which has given some consideration to this agricultural activity is the CARTO, Taiz.

Their soil and water Research Section runs the only testing laboratory in the Country. The laboratory includes three sections: Soil Physics, Soil Chemistry, and Soil Fertility. The first two sections serve soils surveys investigation purposes. The facility was established in 1974. According to Dr. Sharma, a UN volunteer from Nepal, an average of 100 water samples and 150 soil samples per week are routine-tested in the laboratory. Dr. Jewehary, expatriate soil expert, will join the project very shortly as the Soil and Water Research Section's head. The team of soil scientists includes two Yemenis (Dr. Ali Thoor, and Mr. Hadi Said Saad) both educated in Russia, and three UN volunteers (1 from Egypt and 2 from Nepal). Hired help consist of four Yemeni lab technicians trained at the CARTO.

The laboratory has the following equipment: electrical precision balances, 2 microkjeldahl sets, Perkin-Elmer Atomic Absorption apparatus, spectro photometer, flame analyser, pH meters, conductivity bridges, ovens, furnaces and refrigerators. The following soil analyses are performed: soil texture (pipette and hydrometer), pH, E.D., CaCO_3 , organic matter, water soluble cations, exchangeable cations, CEC, available P_2O_5 , available K_2O and total N. Water samples are tested for pH, E.C., Ca, Mg, K, Na, HCO_3 , CO_3 , Cl, SO_4 and NO_3 .

Soils samples which are brought to the laboratory come from different sources: development projects in several regions of Yemen including World Bank projects, British soil survey, French Feasibility study project of Wadi Siham, German experimental farms etc. and from farmer's land. All samples are run free of charge. The extension service of SURDP collaborates with the lab in collecting and transporting samples. Analytical data are recorded but little in the way of recommendation is given. Interpretation of the results is occasionally left to the extension agents who also have to make recommendations on fertilizers and irrigation. This system would work well if the extension agents were well trained for this kind of responsibility. SURDP has the strongest, and, to a certain extent the best qualified extension service in the country. Still their fertilizer recommendations are based on general rather than on specific cases. Among the few sources of recommendation on fertilizer use in the country is Dr. Shahata

Table 4. Fertilizers Recommendations for Maize in Ibb and Taiz Areas
(From Dewan et al.)

Area	Fertilizer Recommendations		Expected Yield (tons/ha)	
	Irrigated*	Non-irrigated	Irrigated	Non-irrigated
Ibb (rainfall 800-1200 mm)	150-150-40 (optimum)	60-60-20	5.5	3.5
	90-120-20 (minimum)		4.5	--
Ibb and Al Kaida (rainfall 600-800mm)	150-80-40	60-80-20	5.5	4.5
	90-150-20 (minimum)		4.5	--
Taiz, Rahida, Turbah	120-200-40 (optimum)		5.0	--
	60-120-20 (minimum)	60-80-20	4.0	--

* Recommendation of application of fertilizers

$\frac{1}{2}$ N + $\frac{1}{2}$ P + all K as basal dose

$\frac{1}{2}$ N + $\frac{1}{2}$ P 40-45 days after sowing

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Chemical fertilizers have only recently been introduced to the agriculture of Yemen. At present there is a fairly adequate service for fertilizer purchasing and distribution, but it is only available in a limited number of localities. There are about three major dealers in the country: one in Sana, one in Taiz and one in Hodaida. The demand for chemical fertilizers seems to be more developed in Taiz and Ibb than it is in Tihama area. The reason is that the SURDP extension service has proved to be efficient in promoting chemical fertilizers in Taiz and Ibb while in Tihama farmers have yet to be acquainted with soil fertility practices and need more intensive intervention from the extension agents. SURDP has designed an extension program whereby field demonstration and farmers' meetings are held regularly at the project's cost. In each area an extension agent deals with 40 "contact farmers" and 4 "leading farmers". Experiments are performed on the contact farmer's land. The leading or representative farmers are the link between the extension agent and the other farmers. They receive free chemicals and free seed from the project.

The chemical fertilizers used in Yemen are: ammonium sulphate (19 percent), ammonium sulphate, nitrate (25 percent), Urea (46 percent), Nitrophos (20-20-0), Triple phosphate (46%) and potassium sulphate (50 percent). Urea is widely used as a source of nitrogen for vegetables and fruit trees. This might not be technically sound considering the nature and characteristics of some soils of Yemen in addition to inappropriate irrigation practices in some areas. My general impression is that the justification for its use is only a matter of popularity and commercial trend.

Manure is less and less used in Yemen and might need to be promoted in some areas of the country where soil alkalinity prevails.

Fertilizers are sold and distributed to the farmers through the agriculture credit loan (ACL) offices. They are mainly purchased from Saudi Arabia, Iraq, West Germany and Kuwait. In addition Kuwait donates some locally-made fertilizers to the Ministry of Agriculture. In 1977, 1,300 tons of Urea and 400 tons Nitrophos were imported and distributed. A higher demand developed in 1978 bringing the stock of fertilizers at the

ACL to 3,000 tons urea, 3,000 tons nitrophos, 1,000 tons ammonium sulphate, 500 tons triple phosphate, 500 tons potassium sulphate. More than half of the stock was distributed by the end of the year in the Ibb and Taiz areas. All 3,000 tons of urea were used. Mr. Mapek Abu Abed, an expatriate economist and manager of the ACL, runs his organization very efficiently: all the Yemeni personnel in his office have been trained by him, books and inventories are carefully kept up to date. He gave us an estimate on the cost of chemical fertilizers: before ACL started their activity, one bag of fertilizer (50 kg) used to cost the farmer, on the average, 120 YR. After 1976 prices were much lower and as follows:

Urea: 48 YR import cost + 18 YR for handling
→ ACL sells it to farmers at a cost of
68 YR (including transportation) a bag

When the farmers buy directly from the dealer, he pays an average of 75 YR/bag of fertilizer (not including transportation). After distributing the fertilizers to the farmers, the ACL, with the help of extension agents whenever possible, makes sure that the chemicals are handled and used properly. Farmers receive short and long term loans from ACL to purchase farm equipment and chemicals.

A good service for recommendation and distribution of fertilizer needs to be developed in the Tihama Region. More intensive extension work is necessary. Even in Taiz and Ibb areas where chemical fertilizers seem to be gaining in popularity, the degree of efficiency with which they are handled needs to be investigated. Here again, the recommendations given to the farmers are based on general observations and might be just acceptable but not necessarily adequate for optimum crop yield.

WATER/SALINITY (References 2, 8, 9, 10, 11, 12, 13, 19, 20)

Less than 10% of the total land area of YAR is cultivated (1.5 million ha), most of it is rainfed and only about 225,000 ha are irrigated. The main sources of irrigation water are: springs, wells, diverted wadis and perennial wadis. With respect to overall water use for agriculture some detrimental practices were observed by the soil scientists of CAPTO: there is a common tendency on the part of the farmers to irrigate more land than they should with the amount of water available. The crop water requirements are

barely met leaving aside the leaching requirements. These practices, especially in areas where water salinity is relatively high, will result in deterioration of soils; salinity will develop. An example of that has been observed in the Lawia area and in the Wadi Siham catchment.

The pH of irrigation water in most parts of the country is within the range 7.5-8.4 except in Wadi Rima and Wadi Zabid areas (Tihama Region) where some of the waters have pH 8.4 and many cause alkalinity problems.

The salinity level of water in the mountain region from Sadah in the North to Al Kaida in the South is low to medium high (E.C. 0.8-3.0 mmhos). From Al Kaida to the South including Taiz, Rahida and Turbah area, the water quality deteriorates from medium saline to high saline (E.C. 2.8-3.9 mmhos).

The main sources of water in the Tihama Region are perennial wadi flows, diverted wadi floods and the wells drawing water from the underlying aquifers. E.C. of the wadi water ranges from 0.9-3.2 mmhos.

Sodium-ion toxicity occurs in many areas particularly south of Al Kaida and in Tihama Region, more specifically in areas closer to the sea coast. Chloride-ion toxicity is also reported in these areas.

Most waters in the country are generally high in Nitrates (0.8-2.5 mg/liter). The source of nitrate is difficult to explain. However, since most of the wadis have their source in the highlands and since most of the rainfall water is lost by infiltration and runoff, during this process nitrates from the soils are dissolved. High levels of Nitrates in the highlands soils can be explained: one needs to look at the organism population of the soils in these areas. Soil moisture and climatic conditions of the highland are favorable for Nitrobacteria activity. The Core Team of Title XII program might investigate the Nitrification process in the soils of the highlands as a possible explanation of the high NO_3 content in waters. Nitrate contents in the water are high enough in some areas to make a significant contribution to the nitrogen levels in the soil. For example in areas where crops are grown under irrigation with water containing 1.8 mg NO_3 /Liter, an irrigation requirement of 3600 m³/ha (as it is the case for corn) will add about 60 kg N/ha to the soil. Since

average fertilizer application for agricultural land is generally very low in Yemen. the problems that normally arise due to high nitrate such as delayed maturity of crops, haven't been encountered so far. Nitrate content of irrigation water should be given due consideration in fertilizer recommendations for crops.

In areas where soil and/or water salinity is a problem, water management is of primary importance. Experiments combining soil fertility and irrigation practices should be carefully designed for significant recommendations.

In many parts of the country water is a limiting factor for agricultural production. This limitation is even more obvious in the Tihama Region where water is either quantitatively limited or qualitatively unsuitable for irrigation because of salinity and/or alkalinity. Good soil research and water management would help improve the agriculture production of the region. Tihama would be a good site for an Arid Land Research Center and experimental stations that focus on the problems of salinity, alkalinity, water stress, plant tolerance to salts and, generally, on agricultural practices in areas where water is qualitatively and/or quantitatively a limiting factor

Although of primary importance, water is not the only limiting factor in the Yemeni agriculture. Soils' chemical, physical and microbiological characteristics, climate, meteorological factors, altitude, solar radiations, heterogeneity in soils and climates, all these factors that constitute an environment for the plants, are determining factors by which agricultural production will succeed or fail. Therefore it is advisable that a Title XII project be created in Tihama and that it should include (in addition to Arid Land studies), studies on environmental factors and their impact on agriculture development in different regions of Yemen in general and in Tihama in particular. This project could be entitled "Arid Land Agriculture and Environment Center".

GENERAL CONCLUSIONS AND RECOMMENDATIONS

1. There is a definite need for soil fertility programs in YAP. The Title XII Core Team will have to concentrate on training and research. We should keep in mind that research, in this kind of program, means applied research rather than basic research and should aim to improve the farmer's conditions

and the agricultural production by responding to problems and immediate needs of YAR.

2. A strong link between the farmers and research centers should be developed in which extension agents should play a major role. Core team might consider two things:

- a. Strengthening the already existing extension services
- b. Starting intensive training for extension agents in areas where they are needed.

3. Training of Yemeni in soil fertility is of primary importance and might be considered as a first priority. Both high level and low level training are needed.

4. Extension agents should be trained to promote chemical fertilizers. They need good training in soil sampling, interpretation of chemical analysis, a basic understanding of soil-plant relationships. Graduates from Ibb School could receive a six month training in research centers and test laboratories.

5. Soil fertility recommendations should be designed as specifically as possible. For that purpose experiments on plant response to fertilizers have to be carried out in localized areas with different microclimates. Environmental conditions and all factors should be taken into account in the experiment design.

6. Experiments should preferably be implemented on existing research or state farms to speed up experimental work.

7. In carrying out soil fertility experiments this general pattern should be followed:

- soil and water testing before planting
- have a complete survey of the land
- take soil and plant tests at regular intervals during plant growth
- take soil and plant tests after harvest to determine total nutrient uptake and chemical fertilizer return.

8. Salinity studies should have the following objectives:

- a. Correct salinity in salt affected areas
- b. Prevent expansion of salt affected soil where salinity hazards exist.

Develop a program of studies aimed to correct salinity and aridity problems and to diminish the risk of soil deterioration and salinization.

9. The regions around Sana, Taiz and Ibb are major centers of extensive agriculture activities where various major donors are concentrating their efforts. In contrast the Tihama area has not received so much attention. The Core Team should concentrate on this region where research and extension are mostly needed.

10. Because of the lack of strong soil fertility and water management programs, only 10% of the total country area is cultivated land.

Agriculture in Yemen can be improved by:

- a. intensifying the production in the already cultivated land
- b. recognize the limitations in the uncultivated lands and thereafter design appropriate soil management programs to extend cultivated areas.

11. The Tihama Region is served by seven wadis. Most of the water is lost by surface runoff or by infiltration. Some areas would have a good production return under appropriate fertilizers and irrigation recommendations.

12. Water and chemical fertilizers interaction experiments are an absolute must, especially in the Tihama Region. On-farm water management and soil fertility studies are needed.

13. Micronutrients should not be neglected in soil fertility programs.

14. There is a need for the creation of an agriculture science library in Yemen. This library should be open for other donors' projects in the country.

TIHAMA

The agricultural land in the Tihama Region can be divided into 2 main landscapes: the alluvial fan with silty loam soils and the alluvial plain with loamy sand to sandy loam soils.

Irrigation on the alluvial fan is by spate irrigation, or is rainfed with additional pumpwell irrigation. In the alluvial plain mainly pumpwell irrigation exists. Groundwaters with high salinity and high SAR could be used on light textured soils where permeability hazard is low. Soil surveys, along with wells and groundwater surveys will help in determining the suitability of the water for irrigation in specific areas. Furthermore a follow-up program (surveys) should be carried on to detect any changes in groundwater quality and soil profile throughout the years.

To avoid salinity hazards leaching requirements should be observed. In areas where basin irrigation is practiced, farmers usually have the tendency to over irrigate; this might give a certain amount of leaching but it still needs to be controlled. Improvements should be aimed at a better distribution over the field at reducing field losses without neglecting leaching requirements. Field levelling is generally poor. In fields where flood irrigation was used, we noticed a lot of heterogeneity in the crops, some fields had flood water at certain spots. In general, wherever irrigation is practiced, water use efficiency is not respected.

In spate irrigation areas the leaching water percolates downwards and will eventually reach the groundwater. In order to check the influence of this salt concentrated water on the groundwater salinity, the E.C. of a number of wells should be checked at regular intervals i.e., monthly.

Investigations in layered soils show that soil salinity occurs in fine textured layers, where these latter overlay coarser textured layers.

For the main wadi areas (Wadi Mawr, W. Surdud, W. Siham, W. Rima and W. Zabid) soil maps or irrigation suitability maps have been prepared or are in preparation by different contractors but they lack uniformity in their legends and scales.

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SECTION C

INDIVIDUAL TEAM MEMBER REPORT
REPORT OF THE AGRONOMIST/SEED SPECIALIST
ON THE TITLE XII DESIGN TEAM YEMEN

J. Thomas

June 20, 1979

Sana, Yemen

Introduction

Under the auspices of BIFAD and in anticipation of using the Collaborative Assistance Method, USAID/Yemen contracted with the Consortium for International Development (CID) to design a cooperative program for developing the agricultural sector of the Yemen Arab Republic. The University of Arizona Plant Science Department has taken the lead and responsibility for the Design Team. Arizona, along with other CID Universities, provided experts for the Design Team which are made up of a Team Leader, and 8 or 9 consultant specialists in various disciplines.

The contract specified that the Agronomist would generally assess the status of agronomic crop production and identify restraints to increasing production of specific crops. This would provide information for development of a strategy and plan to develop the agricultural sector of Yemen. The status of national agronomic research in Yemen was to be determined for field crops specifically, and all crops generally.

A satellite activity in seed multiplication and certification was identified as a possible project under the Title XII which was to be explored and recommendations made. This is in a separate report.

A third related activity assigned to the agronomist was to determine if modern techniques in dryland agriculture are suitable for use in Yemen and make recommendations for the core team.

Status of Agricultural Research in Yemen

The Yemen 5 year plan states as one objective that Agriculture should receive development assistance to allow the country to be more nearly self sufficient in food production. A significant portion of the Yemen food supply is imported which adversely influences the balance of payments. Agricultural research, being a necessary prerequisite to increased production, was included in the country plan of YARG. These problems are being addressed by a number of donors in cooperation with YARG.

The UNDP, in cooperation with the World Bank (IBRD) and U.K., has a number of projects designed to improve the overall capability of the Ministry of Agriculture to carry on competent meaningful research in Agriculture. Project YEM/73/009 - Institutional Support to the MINAG provides for

expatriate advisors in planning, policy, administration, and in some cases, operations. YEM 73/011 provides for assistance in developing agr. services in the Governorate of Hodeidah. Similar projects are planned for other areas of Yemen.

Most significantly, however, the UNDP program includes a project to establish a National Agriculture Research and Training Center (CARTC). YEM/73/010 was started in 1973 and completed in 1978, but has been continued at least to 1981. The project headquarters are located in Taiz where CARTC has been built and research is now underway. Emphasis has been on field crops and soils, but other essential disciplines are being established and a full complement is planned.

Two field substations are already in use. (IBB and Ausseifera Farms) and several more are being developed.

Eventually agr. research will be coordinated nationwide under a Yemen National Research Council (YNRC). The YNRC will act as an advisory body to the Ministry of Agriculture in research and help coordinate the activities of the numerous donors and agencies in the country, including local development authorities (LDA).

Figure 1 gives an outline of the present organization of the CARTC. The Director General is currently an expatriate under the UNDP project. The asterisks on the chart indicate the areas where an expatriate expert is either currently working or is being recruited. Training is a significant aspect of the total program and two experts are currently selecting individuals for graduate work. Hopefully there will be Yemenis sufficiently qualified to assume the work and responsibility in each major area by the time the current program phases out.

The Title XII Design Team Agronomist evaluated the current status of individual crop research in Yemen as follows:

Sorghum (Grain and Forage)

There are two major research programs in sorghum: CARTC in Taiz and the University of Arizona Sorghum and Millet Breeding Project in Sana. A very minor research activity has been going on in the Tihama - mostly a variety yield test and observation plots.

CARTC activities have centered around evaluation and testing of International, FAO, and Eastern African sorghums and evaluation of approximately 4,000 accessions collected in Yemen. 200 of the latter have been selected for further evaluation. Acceptable elite accessions will be multiplied in cooperation with the seed multiplication program and distributed. Introduced varieties have proven better in grain yield and after checking for disease and pest tolerance these will be increased and released also. High yielding dwarf varieties and breeding materials have not been acceptable because farmers need the forage as much or more than the grain.

The local varieties have consistently yielded more forage than introduced varieties according to CARTC tests. Table 1 of this report gives a summary of sorghum yield tests performed in 1975, 76, 77 in Taiz and Hodiedah. There is good evidence that continued work on introducing new genetic lines in grain sorghum will provide material for release that will increase yields. There is equally valid evidence that introduced varieties will not compete with local varieties in forage yield. Educating the farmers to use either grain or forage varieties for specific crops can increase total yields, but there is a need for dual purpose varieties as well. A hybridization program with that objective would be justifiable.

The sorghum and millet project of the University of Arizona has been directed toward development of varieties which will produce well on marginal lands in arid and semi arid areas of Yemen. The current contract was started in January, 1977 and is a continuation of a former contract. To date the breeding work has been confined to the Sana area with demonstration and observation plots planted in 10 locations in the highlands. Breeding aimed at developing varieties for the Tihama is being planned for El Jorubah. Specific reference is made to 1979 Sana Experiment Farm Research Plan and the annual reports. Grain, forage, and dual purpose varieties are being considered and "B" and "R" lines are being identified to make hybrids using male sterility feasible when economic conditions justify them.

Loss of the Sana Experimental Farm to other development places the present program in jeopardy. Another location near Sana must be identified and made available before the fall of 1979 so the area can be prepared for planting in the spring of 1980.

The Yemen government is planning several large development projects in the Tihama. Projects in Wadi Surdud, Wadi Zabid, and near Hodiedah area already in progress under the Tihama Development Authority (TDA). A multi-lateral donor project for Wadi Mohr is currently being funded. Sorghum grain and forage production will obviously be an important part of these projects. Research on breeding, adaptation, evaluation and management of sorghum will be required for each of these areas. Locations suitable for this research should be identified and developed so research can be started in 1980.

Pearl Millet research under the University of Arizona contract is limited to National Pearl Millet Cooperative Yield Tests at the Sana locations. Results show that introduced varieties do not perform as well as local cultivars in general. This is true for both grain and forage. These results are substantiated by trials conducted at the South Gumeisha Farm near Hodeidah (see table No. 1). Obviously further improvement depends on the availability of genotypically superior plants which must be identified. Presumably "within variety" variability is present but no determination of this has been made for this report. Special emphasis on developing varieties in the Tihama for that area should be made.

There appears to be little duplication of effort between the CARTC sorghum program and the University of Arizona program. Logically, these two programs can continue to give independently beneficial results. However, coordination and cooperation between the programs need to take place to insure that duplication does not occur. The highly desirable expansion of the sorghum and millet research program into the Tihama must also be coordinated. This, logically could be done at the Ministry or NRC level.

Corn (Maize). Corn production is estimated at 20,000 hectares in Yemen (1978). Corn is a profitable crop in rainfed areas of Ibb and Taiz, but is mostly grown on irrigated land. In areas where sorghum seedlings fail or are damaged, corn will be used as an emergency "catch" crop and grown under rainfed conditions. Yields are not as high, but emergency production is better than sorghum because it has a shorter maternity time than sorghum.

Recently, special attention has been given by the cereals breeding section of CARTC to improve the total production through introducing high yielding varieties and improving agronomic production. Special reference is made to CARTC/UNDP Technical Report #02 (Maize) 1977.

Thirty varieties from Eastern Africa cooperative trials and 20 from FAO Regional Cooperative trials were evaluated by the FAO expatriate maize breeder at Ausseifera Farm in 1975. All but one introduction exceeded the local checks in both major trials. The introduction yielded from 110% to 228% of the local checks.

In 1976 and 1977 FAO Regional Cooperative Trials and 8 Yemen selections were grown at the South Gumeisha Farm in the Tihama region. More than half of the introduction outyielded the local checks. See Table 1 of this report.

There is evidently no coordinated corn improvement program in Yemen even though the UNDP program provides for an expert in corn breeding. This is unfortunate because there are areas in Yemen, both rainfed and irrigated, where corn could play a meaningful and profitable role in crop rotation and production. Corn is nutritious, palatable and a good source of energy as a human food and would vary the diet of the rural population. Perhaps more important it would fill a need for poultry and livestock feed as an alternative to sorghum.

Concentrated research on corn has largely been discontinued due to lack of someone to head up the program under CARTC/UNDP. Small trials and observation plots are planted by the cereals section at Taiz, but continued neglect or abandonment would be a serious blow to general development of agricultural production in the areas where it is adapted. UNDP is now recruiting for an expert breeder and expect to have one hired by the 1980 season. The program should expand to determine if corn can be profitably grown for a fresh market in the Tihama and other areas of Yemen.

Wheat. A wheat breeding and improvement program was started in 1977 by UNDP-FAO at the CARTC in Taiz and is currently managed by an expatriate trained at the Ph.D. level in cereal breeding, a Yemen counterpart and a UN volunteer plus field help.

The emphasis of the program has been on a short term goal of selecting among introductions, mostly from CIMMYT, and local varieties to provide

improved seed for multiplication and distribution. To date several thousand lines and accessions have been evaluated and 28 have been identified for second and/or third year yield testing.

Most of the high yielding Mexican dwarfs are not suitable because there is an inordinately high and unusual demand for the straw which has a high price and a ready cash market.

Long range goals are the reason for a hybridization program to: (1) incorporate straw production, insect resistance, and adaptation of the local varieties and (2) grain yield, disease resistance and fertilizer response capability of CIMMYT and FAO varieties into lines that can be multiplied and distributed in individual areas. Climatic conditions allow the breeders to produce two generations per year and some promising materials are in BC₅ (June, 1979).

Spring and winter wheats have been evaluated in the Taiz and Ibb areas and the Durham wheats in the colder areas of the country. Soft red spring wheats have proven the best. Winter wheats often do not vernalize. The Durhams are relatively productive, but there is little demand for macaroni type products and no processing capability in the country. The CARTC research personnel are participating in an extension type activity to promote wheat production. Demonstration plots on farmers fields are planted using a "package of practices" that includes improved seed, cultural and management practices, pest control, fertilizers, and harvesting. A final field day is organized and the local farmers can compare yields, practices, and profits of wheat production by traditional methods and varieties with modern methods and varieties.

The CARTC breeding program in cereals has also evaluated a number of Triticale lines. Results have been uniformly good with fertility (seed set) at about 90% and yields ranging from 2.0 to 3.0 MT/Hect. At present there are no plants for promotion of this crop as it is generally considered a specialty feed for livestock and there are more profitable alternatives.

90% of the wheat is intended for rainfed land, but a few lines are being evaluated for irrigated lands as well. A source of high quality wheat seed is essential to a wheat program. The CARTC wheat program will cooperate with the UNDP project YEM/78/015/A/01/12 in Seed Production on medium and small farms by supplying proven genetic lines (breeder's seed)

of selected varieties for increase through the certification system. Approximately 30MT are available in 1979 for distribution. A need for 200 MT has been estimated for 1980 with lesser increases for subsequent years.

National demand for wheat bread is increasing. Present production is approximately 52,000 hectares with an average yield of 1.1 MT/Hectare. This presently provides only 20% of consumption. It is estimated that self sufficiency could be attained by 1990-1995 if area planting could be expanded to 135,000 hectares and if average yields could be raised to 2.0 MT/H. Production of this quantity of wheat would also bring substantial income to the producer from sale of straw which at present represents a better investment vs. profit opportunity than grain production.

In general, it may be concluded that the present program of wheat research and promotion reflects the goals of the 5 year plan and, if carried to a timely conclusion, will provide the increased demand for wheat in Yemen. Obviously, if Yemeni nationals are to assume total responsibility by the end of the program, there will be a critical need for training of competent, qualified wheat breeders.

Barley. A small barley introduction and breeding program is being carried out by the cereals research unit of CARTC. It is being conducted with the goal of improving yields by substituting improved varieties for local ones, and increasing yields through better management and fertility.

The main activity is evaluation of existing genotypes and introduction in various localities. Almost all local varieties are 2 row types (98-99%) and there is good evidence that switching to improved 6 row types will give a substantial increase in yields. Many of the barleys are naked types used for making bread. A number of naked 6 row lines are being tested and demonstrated.

An anticipated sharp increase in the demand for red meat could give impetus to this program, but at present it is fairly modest in scope.

Cotton. Cotton can be one of the best cash crops produced in Yemen. Good growing conditions and ready export markets would seem to be a great incentive for the YARG and producers to invest substantially in cotton production. However, production has declined rapidly in the past 5 years due to a lack of labor for this traditionally hand picked crop. Between

1974 and 1978, total areas declined from 28,000 Has. to 5,000 Ha. Total production went down from 25,000 MT to 6,000 MT even though average yields increased from 800 to 1,200 kg/HA. Some farmers produce cotton only at the insistence of the YARG "in the national interest". Mechanized harvest is clearly the only feasible way of improving production and local varieties produce low quality cotton when harvested mechanically.

There is no cotton breeding being done in Yemen (1979) but several introduced and local varieties have been checked for yield of seed and lint (see Table 1). A number are also being evaluated for mechanized picking. Renewed interest in cotton as a regional crop has been expressed by the TDA and the outlook for increased production is good.

Potatoes. The governments of the Netherlands and West Germany are presently growing observation and evaluation plots of potatoes in three locations in Yemen; near Damar, in the Tihama and in the Amran Valley. Production appears to be good with little disease and few pests. There is good demand for potatoes in Yemen and informal cooperation and coordination will eliminate duplication and provide better results and more credible information.

Sugar beets. The CARTC grew sugarbeets on a trial basis in 1975. Results were encouraging. Yields were in the 40 MT/ha. (18 T/acre) range and sugar content was approximately 15%. They were grown in the Ibb area without irrigation and with only a moderate general fertilizer application.

Yemen has no refining capacity and unless it was constructed, utilization of beets would be restricted to livestock feeding. Excellent silage can be made from beets and beet tops if they are chopped fine enough (1½ to 1¼ inch pieces) or they could be harvested, chopped and fed on a demand basis.

Oil Seeds. CARTC also grew sunflower, safflower, soybeans and peanuts on a trial basis in 1975. They all performed reasonably well, but sunflower proved to be the best. Sesame is already adapted in Yemen. Annual oilseed rape (Brassica napus var annua) may prove to be a valuable oil crop in the cooler humid areas. It is easy to grow and relatively free from diseases and pests. The oil can be pressed in a cotton seed press.

Vegetable Crops

Varieties of vegetables adapted to the Yemen vegetable producing areas can be obtained in Europe and the United States. Vegetable breeding is a costly and highly specialized activity and until there is greater demand for seed vegetable breeding research, it is better left to the developed countries. There is, however, good demand for a great variety of vegetables in Yemen and improved hybrids and O.P. varieties should be tested. There is good evidence that a sizeable and lucrative export market could be developed in Saudi Arabia. A good example is the Okra production and marketing cooperative in the Tihama which enjoys a thriving export market as well as supplying the local markets. Refrigerated trucks could deliver fresh vegetables to South Western Saudi Arabia on a daily basis if a collection and marketing system were established.

Fruit Crops

USAID is currently financing a research and extension project under contract to Tuskegee Institute. Emphasis has been on establishment of source orchards, yield tests and adaptation and evaluation trials. The project is just getting underway despite being in progress for 2 years. CARTC also has a horticulture section where a trained expert is working under UNDP contract. They will work with tree fruits, small fruits, and grapes, but the work is just beginning.

Dryland Resources Development

Land suitable for "dryland" production of crops have soils and sub-soils with good water holding capacity and annual precipitation ranging from 300 to 425 mm. The methods used vary from utilization of water efficient, drought resistant (tolerant) crops to increasing available moisture through rotations, fallow, catchment and mulching. The methods also assume that precipitation comes basically during the winter or non cropping season, with an increase after planting time and then little or no rainfall during growth and harvest.

There are areas in Yemen which have the characteristics described above. Identification of those areas and judicious use of given crops for given areas could significantly add to the national production. Some examples follow.

Cereal grains. Wheat, barley, and oats will produce economical yields at current Yemen prices of grain and straw. Larger areas are most profitable because they can justify purchase of special "dryland" equipment for mulching and moisture conservation. Utilizing a cereal, fallow, cereal rotation can make cereal production profitable where attempts at yearly cereal production would fail.

Millets. Opportunity planting of millets following unusual but periodic heavy rains in dry areas is already practiced in Yemen. This practice should be studied with the objective of determining the parameters under which it is actually feasible and an extension of this made to the farmers. Foxtail, Proso, Pearl, Japanese, and other millet species should be tried.

Oil Crops. Oil crop species such as Castor bean (*Ricinus communis*), Safflower (*Carthamus tinctoris*), Sesame (*Sesamum indicum*), need to be tested and the Jojoba bean should be tried. The bean of the latter crop could be used for oil production or the entire plant could be used as fuel.

Other. Buffalo gourd, Guayule, *Euphorbia* spp. and some medicinals may find a suitable production if markets were developed.

Farm Mechanization. Yemen is unique as an underdeveloped country in that there is a good supply of money in the private sector, high prices, and a shortage of labor. This shortage of labor makes mechanization of crop production essential, regardless of the restraints, if agricultural production is to increase. The main restraint to mechanization in the traditional context is the small size of fields (terraces) and their relative inaccessibility. The only area of Yemen where large, high power, efficient machinery could be justified is in the Tihama. In all other areas fields are relatively small and average less than 0.5 Hectares.

The British Overseas Development Ministry has a project in Taiz instructing qualified students in farm machinery. After 3 years of experimentation and training, their conclusions are as follows:

- 1) Many farmers can justify a two wheel drive two axle tractor of 30-50 drawbar horse power. Encouragement to use these tractors for more than basic tillage is necessary if maximum use is to be realized.
- 2) Where fields are too small or access is difficult, 2 wheel single axle tractors could be efficiently used. Soils are

relatively light and these tractors would have sufficient power to do basic tillage besides being extremely versatile in all other cultural practices.

- 3) Greater use of adapted seeding, cultivating, spraying, fertilizer and equipment is possible and needs to be explored and promoted.
- 4) Mechanical power driven harvestors and threshers of medium to small size would be acceptable and greatly reduce the critical harvest period.
- 5) Small portable motors to drive grinders, choppers, cleaners, and threshers are available and adaptable and could be utilized by most farmers to reduce high labor costs.
- 6) More use could be made of rototiller type equipment in vineyards, small orchards, and very small terraces, but general use would tend to break down soil structure.

Research Facilities for Crops. Good agricultural research depends on a number of interrelated factors. Obviously well trained professional research personnel who are independently motivated, who can cooperate with related disciplines, and who are adequately compensated, are essential. Almost equally important are facilities, equipment, and space in which to conduct agreed upon research. All of these factors imply sufficient financial resources to support research activities that can take full advantage of the talents and expertise of the researchers.

The Ministry of Agriculture through the National Research Council and/or other agencies in Yemen should provide adequate laboratory and field space so appropriate needed research can be conducted in the principal production zones. These research centers and farms need to be so arranged so that each scientist can have complete control of his own research activities and facilities. Less than this jeopardizes experiments and produces unreliable research data. This does not mean that scientists cannot cooperate on the use of space, equipment, water, laboratories, and technical help, but each researcher must be able to perform activities according to schedules demanded by the research. If duplication of equipment or private space is necessary to insure control, then it is cheaper to provide the equipment and/or space than to lose a full year of data which

may extrapolate to a loss of enormous potential income on a national or regional basis each year new crops or techniques are delayed.

The CARTC in Taiz is potentially an excellent research center. Each main region or ecological zone in Yemen should have a similar center. In addition, there needs to be smaller research farms in a number of locations in each zone to allow research techniques and materials to be evaluated where control is possible. These smaller farms will serve as extension and demonstration facilities as well and engender "confidence" in the work done by the Ministry of Agriculture.

Several such sites have been identified while others are needed. A listing follows which is not necessarily complete. All crops adapted to the area can be included.

Southern Uplands Region

CARTC in Taiz - established and functioning.

Ibb Farm - established but needs equipment and facilities.

1 location south of Taiz - required

Central Highland Region

1 Central Research Farm - required, could be associated with the College of Agriculture and/or the Animal Research Farm. Should be near Sana.

1 Farm in Northern Sector - required.

1 Farm in South East Sector - required.

Tihama Region

Wadi Surdud Project - 20 hectares are planned to be separated for a research farm. Equipment and facilities will be needed.

South Gumeisha Farm - 20 hectares will be designated as a research area. Equipment and facilities are available.

El Jeruba Farm - Operational but facilities and equipment required.

Wadi Mawr - When this area develops, a research farm needs to be provided.

The most urgent need at this time (1979) is for the Ministry of Agriculture to provide a research location close to Sana. This is urgently

needed so that sorghum, millet, and horticultural research already started can continue in this area without interruption. The present locations at Bir-el Ghom and Bir-Achir are surrounded by urban developments and will likely be utilized by the city or YARG for other purposes. Control is different on these farms and they are subject to stray animals, people and vandalism.

National Research Coordination

Coordination of Agricultural Research in Yemen needs to be accomplished on two levels. Formal coordination and assignment of research tasks should be done by the NRC with inputs from Ministry of Agriculture Research Station Directors, and the National Extension Service. This will allocate assignments and resources to appropriate areas and individuals and prevent major duplications or confrontations.

Informal coordination is also essential and may be more important from a productive viewpoint from formal coordination. Informal coordination should take place between and among scientists involved in similar disciplines and working on similar crops and problems. Free exchange of information between scientists must be encouraged and a vehicle for that exchange provided.

The following are some suggestions:

- 1) Encourage publication and distribution of station reports.
- 2) Encourage information exchange by dialogue and visits between scientists in different localities.
- 3) Publish a Yemen National Agricultural Science Review.
- 4) Form a Yemen Agricultural Society to promote excellence in research and hold annual meetings where Yemen scientists can present papers resulting from their research to peer groups.

Recommendations to the Core Team

The Consultant Agronomist on the Yemen Title XII Design Team presents the following recommendations for consideration by the Core Team as potential Title XII activities in the Yemen Agricultural Sector Development.

- 1) a) Bring the Arizona Sorghum and Millet Program under the Title XII activities and initiate work in the Tihama region at Wadi Surdud, South Gumeisha Farm and El Jeruba Farm, b) Encourage

MINAG to provide a research location near Sana so present breeding and testing work can continue without interruption, c) Begin more intensive selection and breeding with millet in Tihama from local forage and grain types.

- 2) In cooperation with UNDP, or separately, develop a program in corn breeding and management with the objective of encouraging producers in rainfed areas to produce more corn for human consumption, livestock feed and oil production.
- 3) Periodically review the status of wheat and barley breeding and production, and make recommendations to Min. Ag. for new programs, materials, or activities.
- 4) In cooperation with the TDA, periodically review cotton production and suggest methods of improvement in production and marketing.
- 5) Determine the need and feasibility of a comprehensive oil seeds development project to reduce the present heavy importation of edible oils.
- 6) Determine the need and feasibility of increasing vegetable production and export market in Yemen.
- 7) Establish a cooperative relationship with the Tuskegee Institute in Horticulture Research and Extension under the Title XII arrangement.
- 8) Develop a project on Dryland Farming and Dryland Resources Development in the marginal rainfall areas of Yemen to introduce drought tolerant species and determine management requirements.
- 9) Cooperate with the British Overseas Development Agency in Taiz in appropriate mechanization of Yemen farming.
- 10) Participate in the Min. Ag. planning of research and extension programs in crops at research centers and experimental farms.
- 11) Gain membership on the Yemen National Research Council and serve as advisors to research centers in appropriate disciplines.
- 12) Sponsor a Yemen National Agriculture Society and host an annual meeting for participation by Yemeni scientists and expatriate experts.

- 13) Prepare a project paper to develop an Agriculture Research Library and Documentation Center under the Ministry of Agriculture or the College of Agriculture.

Table 1

Summary Selected Field Crop Tests Performed in Yemen Arab Republic
1975, 1976, 1977^{I/}

Test	No. Entries	Yield (Kg/Ha)		Local Variety	No. Exceeding Local
		Range	Ave.		
TAIZ (Grain Sorghum)					
FAO Reg. '75	12	204-4077	2294	1959	7
FAO Reg. '76	20	214-2862	1088	2120	3
Cold Tolerance	16	315-1933	862	1933	0
USDA Intro. '76	11	328-2302	1060	2302	0
ALAD Reg. '76	5	450-2628	1086	2628	0
ALAD Reg. II '76	5	1165-2181	1528	2181	0
ALAD Reg. '75	60	0(2)-2092	1016	1731	6
Early Var. '75	12	595-3723	1788	787	8
Exotic FAO '76	38	0(4)-4167	1556	2133	9
Intro FAO '76	26	0(5)-3135	1372	1559	9
Intro FAO '77	19	0(4)-2444	952	1162	7
IBB (Grain Sorghum)					
Intro FAO '76	26	0(1)-5276	1828	1726	11
ALAD Reg. '76	4	929-3487	2136	2212	1
So. GUMEISHA FARM TIHAMA (Grain Sorghum)					
FAO Reg. '77	17	822-4081	2142	1549	13
YEMEN Reg. '77	8	868-3119	1728	1475	4
TAIZ (Forage Sorghum)					
ALAD Reg. '76	4	929-3487	2136	2212	1
So. GUMEISHA FARM TIHAMA (Forage Sorghum)					
FAO Reg. '77	17	1689-13082	6713	13082	0
YEMEN Reg. '77	8	6746-16018	9775	16018	0
So. GUMEISHA FARM TIHAMA (Pearl Millet-Grain)					
FAO '77	8	1667-3101	2641	3078	1
So. GUMEISHA FARM TIHAMA (Pearl Millet-Forage)					
FAO '77	8	2715-20,889	8853	20889	0
So. GUMEISHA FARM TIHAMA (Maize-Grain)					
FAO Reg. '76	25	2805-6007	4852	5154	10
YEMEN Reg. '77	8	2171-5465	3826	3025	3
FAO Reg. '77	20	2223-4924	3653	4107	8
So. GUMEISHA FARM TIHAMA (Cotton Seed and Fibre)					
YEMEN	9 Seed	974-2552	1762	1553	4
YEMEN	Fibre	352-1008	681	582	4

Seed Multiplication

The following report is made as part of the total response requested by USAID under the charge to the Title XII Design Team for Yemen.

Seed multiplication is an essential component of agriculture production whether in developmental or advanced stages. The use of high quality seed is beneficial from at least two aspects; more vigorous germination and initial growth and the opportunity to provide improved varieties which yield more of the desired product. Purity of seed which allows more quality and product control is of secondary importance in developing areas but is easily built into the production system and overtime will prove worth the cost.

The growth of the economy of Yemen in the next decade will demand significant changes in agricultural production and marketing methods. Increased demand for high quality food will provide impetus for increased yields on more area. Traditional production methods will not be able to respond to this need and preparations must be made now to provide the technical competence and institutional infrastructure to permit and aid these changes to take place in an orderly and coordinated manner. A reliable source of high quality seed of adapted productive varieties in sufficient quantities and at a price producers can afford is recognized as an essential ingredient in any food production system. Methods to provide this seed have been defined and proven and are generally accepted by countries throughout the world. Successful seed programs encompassing production, processing, distribution, and marketing vary from country to country, but under the auspices of the Food and Agriculture Organization (FAO) of the United Nations, successful programs have been organized in many countries which have common characteristics.

Yemen's five year plan included increased production of essential crops. Subsequently, the "Country Program" of the UNDP provides for a seed production program to be started. General reference is made to the UNDP Program for the YAR (January 1977-December 1981) and specific reference to UNDP project YEM/78/015/A/01/12 (January, 1978) Seed Production at medium and small size farms.

This project provides for the establishment of a Seed Production Program along classic lines, i.e., introduction, production, multiplication

and distribution using the controlled generation system of breeders, foundation, registered and certified classes of seed. It also provides for an expatriate project supervisor who will direct all the activities for the life of the project. After the initial 3 year operated program is completed, the project can ostensibly be operated exclusively by the Ministry of Agriculture through the Central Experiment Station or a National Seed Certification Organization similar to those operating in other countries. No training is provided for in the project. Initial activities will concentrate on production in the Taiz-Ibb goverorates with sorghum, millets, maize, and wheat. Distribution will be nationwide, and both production and distribution will expand to meet demand. Projected demand for improved certified cereals seed has been estimated at 30 MT in 1980 and 300 MT in 1981 with less dramatic increases in subsequent years. A potential demand of 5,000 MT has been estimated and production and processing capacity for that amount is planned in the project.

Cotton was originally planned in the UNDP project. It was recently (1979) decided that cotton seed production would be handled in the Tihama by the Tihama Development Authority in conjunction with the Ministry of Agriculture and a separate bilateral donor.

USAID and Title XII Core Team Activities

In appendix A "Operational Plan" of the Title XII design project a number of satellite activities were tentatively identified and the Design Team was charged with determining the need and providing PID's if necessary. The Core Team will make an indepth study to facilitate PP or SPP writing for submission to USAID/Y and the YARG.

Seed multiplication is one of the tentative satellite activities. This report is in response to the charge given the team with direct reference to the situation in Yemen regarding Seed Multiplication and Distribution.

It appears that the UNDP/YARG program will develop a seed multiplication and certification system to satisfy the country's needs. This certainly need not be duplicated in other programs, and new programs should consider working within the system when certified or quality seed production is needed. The presently planned project can expand to provide seed and

service to any region and crop if proper coordination and advance planning are done.

However, if the Ministry of Agriculture is to gradually assume full operational responsibility there must be sufficient trained Yemeni personnel to take over at the end of the UNDP input. Since no training is provided for under the plan, training seed personnel must be provided for by other means and donors. USAID/Yemen has tentatively agreed to provide this training. The following specialists with specific training will be needed initially.

- A) National Director of Seed Multiplication and Certification - M.S. or Ph.D. in Seed Technology and Administration.
- B) Seed Laboratory Technologist and Seed Analyst - B.S. or M.S. in Seed Technology.
- C) Seed Production Officers - Graduate of Technical Seed Technology and Production Course such as Mississippi or Oregon short courses.
- D) Assistants - trained in Yemen through short courses as needed.

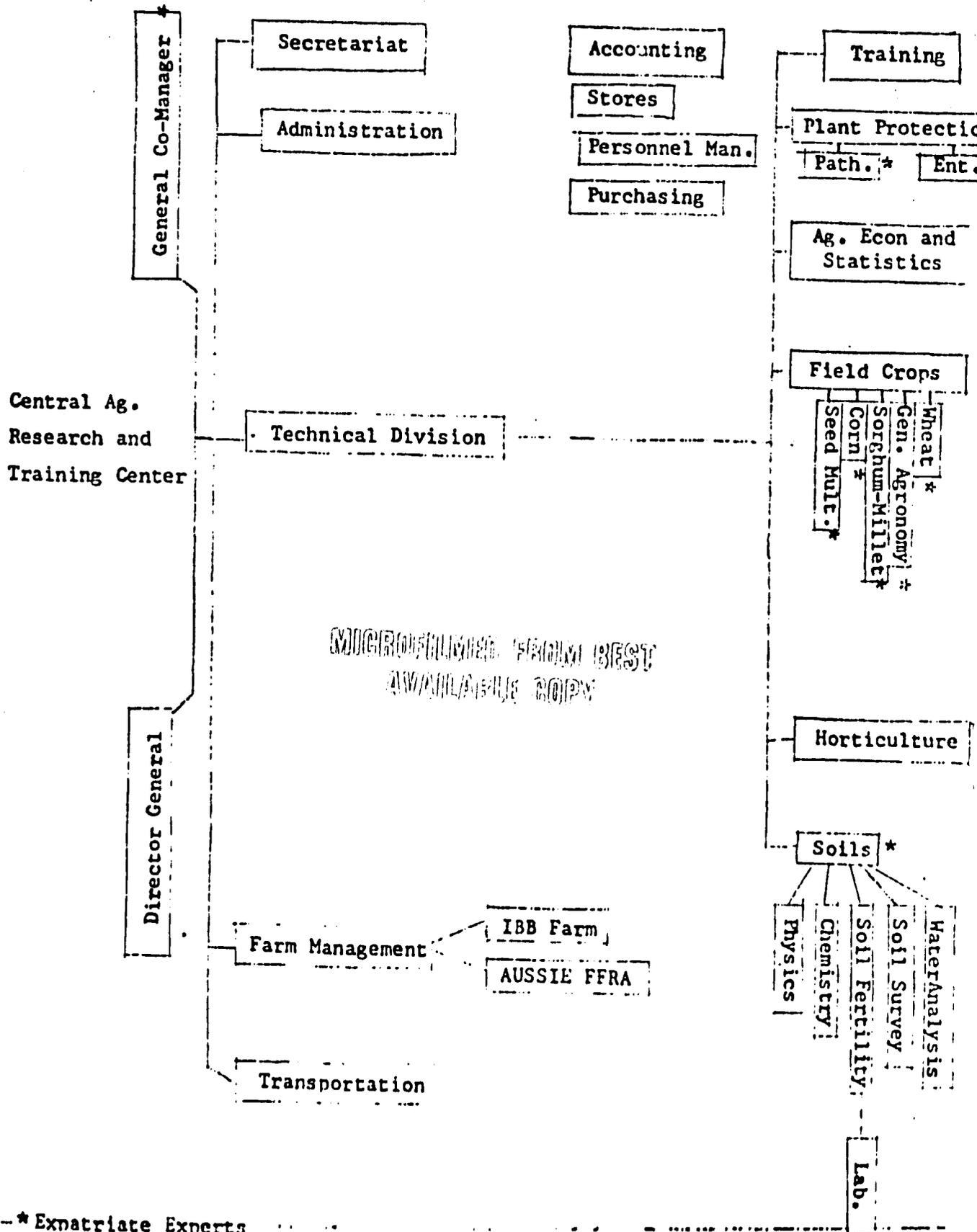
Estimated Man/months of training required.

- A) 1 x 36 = 36
- B) 1 x 24 = 24
- C) 3 x 6 = 18
- D) 10 x 1 = 10

TOTAL 88 man months

It is recommended that the core team help the Ministry of Agriculture identify qualified individuals to receive this training. This is a priority activity and should be done as soon as the core team arrives. This will allow the proposed National Director to complete his training and return to Yemen before the UNDP expatriate professional completes his term (1982).

Figure 1



SECTION D

INDIVIDUAL TEAM MEMBER REPORT

**Contribution of
R. P. Upchurch
as an
Individual Team Member
to the
Design Effort
for the
Yemen Title XII Program
on
Agricultural Development Support**

In the Fall of 1978 USAID issued a Request for an Expression of Interest (RFEI) for the Design of a comprehensive Agricultural Support Program for the Yemen Arab Republic. The Design was to be done under the collaborative mode envisioned by Title XII of the Foreign Assistance Act. Presumably, the entity responsible for the design phase would ultimately provide for implementation. The Consortium for International Development (CID) responded to the RFEI and in due course was selected to execute the Design Phase. The University of Arizona was designated by CID as the Lead University and the writer was designated as Program Director for the effort.

Several months elapsed in early 1979 while USAID evaluated CID's cost proposal. A meeting was finally held by USAID and CID in Denver in March 1979 to resolve the technical issues involved. A contract followed shortly thereafter.

The writer was fortunate to be able to visit Yemen in January 1979 in connection with the Sorghum/Millet Improvement Project being executed in Yemen by the University of Arizona under USAID contract. An advantage was taken on this visit to confer with various individuals about the impending Title XII Design effort. Mr. James Wood of CID Headquarters was also present for these discussions. Mr. Wood has continued to serve as the contact person for the Yemen Title XII Program in CID Headquarters. A trip report on the subjects considered is attached hereto. This document was subsequently made available to Design Team Members as background material.

In due course an excellent Design Team representing several CID Universities was assembled primarily through the efforts of CID Headquarters. Dr. Donald G. Heckerman of the University of Arizona was appointed Design Team Leader and was assigned to Yemen for three months to provide in-country continuity. The Program Director assumed the role of traveling back and forth between Yemen and CID during the Design effort so as to maintain effective cross-communication. Visits were made to Yemen during May, July and August.

CID had been encouraged by USAID to enlist the aid of a middle-eastern university for the design and implementation effort in Yemen. The Program Director made two trips to Lebanon in 1979 in an attempt to enlist the aid of the American University of Beirut. AUB appears capable and interested in joining the CID effort but financial arrangements satisfactory to USAID and AUB could not be finalized to allow AUB to participate in the design effort.

In June when it became obvious that AUB would not be available to assist with the Ibb School, as originally anticipated, steps were taken to select a CID University to fill this role. For this purpose, New Mexico State University was selected in early July with Dr. Harold Matteson serving as Ibb Leader. The Ibb effort proceeded under the overall direction of the Program Director (see Matteson's report and the Ibb Project Paper). Hopefully, CID will still be able to convince AUB to join the Yemen program.

In order to get early action on the Ibb School, Mr. Nabil Khaldi was hired to come to Yemen as a consultant starting in late June.

In order to utilize the collaborative mode the Program Director repeatedly held meetings with high level officials in the Ministry of Agriculture (MOA), the Ministry of Education, the USAID Mission and with other Donors. The Design Team Leader participated in these sessions and held subsequent follow-up meetings. The Design Team Leader maintained an office in the MOA and in the USAID Mission. The Mission Director and the Deputy Mission Director were especially helpful in aiding the Design Team to establish a rapport with key officials in Yemen.

In July the Program Director, Design Team Leader and key Mission officials reached agreement on the main components of the proposed program. The outline agreed upon was immediately presented jointly by CID and the USAID Mission to the MOA. (A copy of this outline is attached to the Summary Record of the Final Design Team meeting.) Agreement was reached by all concerned as to the broad outline. Following additional refinement, the program was again presented in August to the MOA including the newly appointed Minister of Agriculture.

Prior to the departure of the Design Team from Yemen in August 1979, a draft copy of the Team Report and the draft of a Core Project Paper was officially transmitted to the Mission thereby formally meeting certain contractual requirements. It was mutually agreed by the Mission and the Program Director that the Mission would refine the draft Project Paper and submit it to USAID/W.

In order for CID to have a finished work product action was taken to have the Design Team meeting Tucson, Arizona on September 5 and 6, 1979 to review the draft of the proposed output and to make refinements. (The Summary Record of that meeting is attached to this group of individual reports.) The principal thrusts of the Design Team report were confirmed in the September meeting.

One issue was raised regarding the relative roles of the Lead University, CID Headquarters and other participating universities. Some progress was made on this issue but additional attention is to be given to this matter in late November, 1979 at a special CID meeting.

In October 1979 the Program Director was called upon to make another special trip to Yemen under the Sorghum/Millet Improvement Project. During this visit, conferences were held with Mission personnel regarding their progress in finalizing a draft of a Core Project Paper. It was confirmed that the Design Team Output and the Mission Draft was still in harmony as of October 18, 1979. During this visit, it was mutually agreed that CID should provide a representative to work with USAID/W when the PP arrives in Washington. This consultation is now anticipated for early December, 1979. In the meantime, the Mission and CID are exploring ways of taking advanced action on certain key parts of the Title XII Program.

The official work product of the Design Team should issue about November 1, 1979. The Design effort itself will continue cooperatively with USAID until implementation commences. In the meantime, on behalf of CID and the Lead University, I want to thank all of the Design Team Members, the USAID officials and the Yemen officials who have worked together to produce a significant set of documents. A special note of thanks is due to Don Heckerman who served in many capacities in Yemen and to Russ Olson who worked so well with the Team.

R. P. Upchurch
CID Program Director
Yemen Title XII Program



PRELIMINARY CONSIDERATIONS CONCERNING A TITLE XII AGRICULTURAL PROGRAM IN THE YEMEN ARAB REPUBLIC (YAR)

MEMO FOR THE RECORD - February 18, 1979. A Report of Visits to Lebanon and Yemen in January/February, 1979.

I. INTRODUCTION

In early 1979 USAID tentatively selected the Consortium for International Development (CID) to field a Design Team for a Title XII Program in Yemen. In this effort, the University of Arizona was designated as the Lead University and Dr. R.P. Upchurch of the University of Arizona was appointed as Design Team Leader. It is presumed that a successful Design Team effort will result in the implementation of a major program by CID in Yemen with the University of Arizona continuing as the Lead University. Substantial roles are also visualized for certain other CID Universities and special collaboration with the American University of Beirut (AUB) is visualized in both the Design and Implementation Phases. Approximately ten scientists are to be involved in the Design Effort beginning in the Spring of 1979.

While the Cost Proposal for the design effort was being negotiated, an opportunity became available for some on-site discussions in Lebanon and Yemen. This Memo-for-the-Record is a report of these discussions which involved a visit by R.P. Upchurch to AUB, January 22-24, 1979 and a visit by Upchurch and Mr. Jim Wood of CID Headquarters to Yemen, January 22-February 1, 1979.

II. VISIT TO AUB

An excellent opportunity was presented to visit formally and informally with the faculty and administration at AUB. The visitor was a houseguest of Dr. and Mrs. John L. Fischer and they kindly hosted a social function involving AUB President Harold E. Hoelscher and key faculty members. The special hospitality was much appreciated.

The unstable political situation in Lebanon over the last year or so has handicapped AUB programs in Agriculture. Although the political situation remains very delicate AUB appears to have much support among the various factions and it continues to have a preferred status in the Country. Dean Fischer, having assumed his position within the past year, is providing energetic leadership and the faculty is very supportive of his program. Modest expansions and improvements in faculty, staff and facilities are in evidence. A visit to President Hoelscher revealed that the program of the Faculty of Agriculture ranks high in AUB and that there is sanction for a strong local program as well as for a technical outreach program in the Middle East.

The Agricultural Program at AUB has concentrated on BS level training of a high caliber and this has gained recognition throughout the Middle East and elsewhere. Students take two summers of practical training at the Field Station in the Baka Valley. As middle-eastern agricultural colleges develop capability for BS level training, AUB anticipates shifting emphasis to MS level training in agriculture. English is the medium of instruction at AUB in the regular program although short courses on and off campus may be in Arabic.

The agricultural faculty at AUB is impressive in the overall sense as regards technical expertise and as regards their capability and background in dealing with the introduction of modern technology into the complex social system of the Middle East. This comes from having a good mixture of personnel steeped in both the middle-east background and in high technology societies. The AUB faculty appears to be limited in depth. Departments are small and the faculty is heavily obligated to the on-campus instructional program. Assessing the available expertise will take careful planning, a recognition of prior commitments and providing reasonable lead times. Even in the face of these limitations, the contributions which AUB could make to a Title XII program in Yemen are impressive. AUB has a special capability for recruiting technical personnel from throughout the Middle East. This could be very useful for a program in Yemen.

The AUB agricultural faculty is encouraged to undertake research as a supplementary effort. In view of the limited time, resources and facilities available for research work there have been some reasonable accomplishments in this area. By present day standards, AUB is only modestly equipped for research work.

During the visit, I personally became aware of expertise in the fields of seed multiplication, soils, irrigation, livestock production, weed control, food processing, agricultural economics and agricultural extension. I was especially impressed with the expertise of Dr. Paris Andreou in the field of Cooperative Development and with the expertise of Dr. Fawzi Al-Haj in the field of resolving institutional relationships at the highest policy levels in middle-eastern countries.

Dean Fischer and I discussed contractual relationships and found no bars to collaboration. We discussed the possible availability of specific faculty members. He has the greatest flexibility over the spring break (April 11-25) and after the Spring Semester which terminates June 2.

In some instances, we may wish to have some AUB professionals visit Yemen for as little as one week. Some individuals may only be available for such a period of time and the nature of their expertise could make the short visit worthwhile. Another agreed upon approach is to have Program Personnel stop by AUB for consultation for one to several days.

Dean Fischer is willing to be a collaborator in helping to develop and operate the vocational agricultural high school at IBB. The exact roles to be played here by various individuals and organizations must be developed as an early priority but more background information is required before roles, timetables, functions, etc. can be established. Dean Fischer desires to be involved in program development, management and operation as contrasted to serving as a supplier of "bodies" for specific jobs. I assured him that the various CID institutions have the same concern and that being alert to this matter, we can hopefully achieve a satisfactory solution.

A list of the AUB Faculty of Agriculture and Food Sciences (October, 1978) appears as Attachment A to this Memo.

I departed Lebanon with a very positive feeling about the prospects for embracing AUB as an effective short-and long-range collaborator in a Title XII Program for Yemen.

III. EXTRACT OF INTERACTIONS WITH USAID MISSION ADMINISTRATIVE PERSONNEL IN YEMEN -
Mr. Robert G. Huesmann, Director; Dr. Mary C. Neville, Deputy Director; Mr.
John J. Young, Agr. Dev. Officer and Mr. Harry R. Johnson, Program Officer.

- A. Title XII Role. Numerous Donors are operational in Yemen and this complicates the definition of the scope of the Title XII Program. A function of the Design Team will be to learn more fully what roles are already being filled by present and projected Donors. In the process, a complementary role for the Title XII Program should evolve. Special recognition must be given to the fact that the International Bank for Reconstruction and Development (IBRD-"World Bank") has in place a program of advising the Ministry of Agriculture. This is operated partially through the Food and Agriculture Organization (FAO) and the United Nations Development Program (UNDP) of the United Nations. The senior member of this team is Co-Director Mr. Kamal Mansour, a Sudanese National, who is housed in the Ministry. Another Co-Director is Dr. Jamal Fuad who is located at Taiz. Dr. Fuad directs a substantial technical program at Taiz. He arrived at post January 1979. Each Co-Director has several senior staff members. Director Huesmann desires the Title XII Program to play some major roles at the National level and to develop a high level of creditability within the Ministry at the highest level. These roles must evolve through collaborative efforts with the IBRD Advisory Team which has been awarded recently an extended life of several years with assured funding.
- B. IBB Vocational Agricultural High School. The physical plant is being built with IBRD funds. UNDP/FAO was to operate the school but funds for that phase are not available. USAID has agreed to operate the school and this will become the first operational project under Title XII in Yemen. There have been several delays in completing the facility and the present projected operational date of September 1979 is subject to considerable uncertainty. Huesmann is anxious for us to get off to as good a start as possible on this project. He suggests that a continuing series of positive steps on this project will offset concerns the YARG may have about the school becoming operational by a particular date. Huesmann is moving to implement at an early date a mobilization team for the IBB school. This will require a Project Paper (PP) which can be approved at the Mission level. This team could be a first (and early) unit of work to be funded with CID under Title XII. The team could consist of 3 - 4 expatriates to be concerned with:
1. Personnel Schedule/Recruiting Staff and Students
 2. Physical Plant Development/Operations -
 3. Curriculum Development -
 4. Farm Development -

The Personnel Officer would look into all aspects of faculty, staff and student recruitment and would specify requirements for their subsistence. The Physical Plant Officer would monitor completion of the facilities including inventory and placement of furnishings. The Curriculum Officer would develop the course offerings and prepare instructional materials. The Farm Officer would design and implement farm activities to provide practical experience for the students. In principle, the school is to provide 10th, 11th and 12th grade education. In practice, it is recognized that the shortage of candidates with 9th grade training may require the acceptance of candidates with less than 9th grade training for the initial years of the project. The curriculum must be designed to accommodate this prospect. Activities of the school must be coordinated

with the Ministry of Education which will provide some counterpart instructors and administrators. However, the prime instructors must be recruited from outside Yemen. The medium of instruction will be Arabic, although English may be a subject to be taught. The school is to have a very strong practical orientation, although the movement of graduates into B.S./B.A. level programs cannot be discounted. The original paperwork justifying the school and the result of a late 1978 team appraisal (Kougler Report) of the school will be available for study by the Design Team.

- C. Support Function. Huesmann stresses that the Title XII Program must develop its entire support function. The Mission will cooperate during a phase in program on support. Title XII must supply its own transportation, support staff, importation and warehousing of Program supplies, housing, etc. The Mission has land available for housing but funds for construction would have to be a part of the Title XII Contract. It is clear that Title XII must have a General Services Officer equivalent posted to Yemen promptly to begin implementation. There is some possibility of using house trailers in Yemen. Some have been available from Jiddah requiring two months for delivery.
- D. Title XII vs. Existing Projects. At some convenient point in the future, the current USAID Sorghum/Millet Project in Yemen will be embraced by the Title XII Program. The USAID Poultry Project is currently being extended on an ad hoc basis. If it is to be continued on a regular basis, it should be done under the Title XII Program. (The Ministry of Agriculture desires an extension of this project - see comments elsewhere). The Mission is continuing its negotiation with Tuskegee Institute relative to the operation of the Horticultural Project. The future relationship of the Horticultural Project to the Title XII Program requires further consideration.
- E. Support of Design Team. Huesmann agrees to provide housing for the Design Team. Hopefully, minimal housekeeping facilities can be purchased locally. One or two individuals indicated some prospects for this. The Design Team will rent local cars and drivers as necessary. See Attachment B for status of rental prospects. Secretarial and office space for the Design Team was not resolved.
- F. Training Under Title XII. There must be a substantial training function including in-country, middle-east, USA and other advanced country components. There must be a proper balance of training in Arabic, of preparing Yemeni's to take training in English and of preparing Title XII expatriates to manage in Arabic. The question of how to coordinate Title XII training and the current Mission training program in Agriculture needs further consideration.
- G. Huesmann suggests that Upchurch visit IBRD headquarters in Washington, D.C. regarding the Yemen Program. Also suggests that Russ Olsen be requested to set up a session with Joe Wheeler.

IV. SUMMARY OF UPCHURCH/WOOD STUDY OF THE IBB SCHOOL PROJECT

A. Visit to Ministry of Education accompanied by Edwin Tolle of USAID. Discussion with Dr. Elias. He heads a UNESCO Advisory Team for the Ministry of Education. Once had 23 members. Elias indicates that all equipment and furniture for the IBB school is now on hand in Yemen (in Hodeida?). Six Yemenis have been sent to Iraq to get BS Degrees in Agriculture. They are to be assigned as counterparts instructors for the IBB school. They have been trained in English. Four have already finished their degrees and are back in Yemen. Two more are due back this spring. [Before leaving Yemen, Upchurch suggested that these six counterparts be assigned to take some of the training courses presently offered in Yemen - i.e. - poultry training (USAID), ag equipment training (British Project - Taiz) and extension training (FAO - Taiz)]. The Minister of Education also has available for the IBB school Dr. Mohamed Al Harazi, a Yemeni, who obtained his Ph.D. at the Seventeenth of November University in Prague. Dr. Al Harazi is approved for training in US. [Upchurch agreed to explore the accommodation of Al Harazi at a CID institution - possibly at the U of A]. Elias indicates that very little has been done on curriculum development for the IBB school. Originally, the school was to embrace:

1. Agricultural Vocational High School - Grades 10, 11, 12 - 60 students class
2. Two Years Post-High School Training (Hence a Jr. College)
3. Short Courses for Farmers

The school was to embrace Field Crops, Horticulture Crops, Soils, Veterinary Practice (Livestock Production).

(The Yemeni school system starts at Age 6 with 6 years of elementary school, the three years of preparatory school and the three years of high school. This system has been operational only a few years and it has not been followed vigorously; hence there are relatively small numbers of bonafide graduates).

Elias indicates that there was an Agriculturalist on his advisory team at one time and that IBRD anticipates providing a replacement in due course.

Elias understands that the IBB school very well may not open in September 1979. Elias suggests that the IBB school may evolve into a College of Agriculture.

IDA has agreed to fund the construction of a counterpart to the IBB school at Surdu next year. They also agree to fund a Vet school in Sana'a.

B. Visit to British Mechanization Project at Taiz. Conferred with Project Leader Mr. Jim Williams. He has been here one year and anticipates at least two more years service. This Project is considered national in scope but except for a few demonstrations, has been limited to the Taiz area. Presently, the headquarters and the original training site is in downtown Taiz. A new workshop, new offices and a hostel for students is under construction at Asiphia, a location elsewhere in Taiz. The project involves training, evaluation of farm equipment, extension work in mechanization, advising the YARC (Min. of Ag and the Bank) on importation of farm equipment. Jim now has one of his

employees, David Allen, located in the Credit Bank in Sana'a. Jim stresses that agricultural training projects in Yemen should stress the practical and that students should learn by doing. Jim takes a very cooperative stance. He would be willing to help out at the IBB school (75 minutes away) in any way possible.

- C. Visit to FAO Extension Training Center at Taiz. An initial discussion was held with Dr. Jamal Fuad, the recently arrived Director of the FAO Agricultural Project headquartered at Taiz. This has a research and a training function. Here we will discuss the training function. The training concerns an eleven-month course for individuals having finished the 9th grade. The object is to train the students to serve as extension officers. Upon certification, they are to be hired by the Ministry of Agriculture. Due to a lack of prepared students, the project last year accepted students with only 7th grade training and this year they are compromising even more. Discussions were held with the two key instructors in the program, M. Swelem and F. Sileem. They were most cooperative and provided a paper on their current program entitled "Extension Training Program, Fifth Center - 1979". See Attachment C. They will accept 60 trainees in 1979 (starts in a few days). They pay 600 Rials/month to students plus 300 additional/month for students who come from a great distance. This program is handicapped because there are no dormitories available. A house has been started for those who come from a great distance. So far, four classes have been completed and 87 individuals have been certified. The program runs for 11 months from February to December. There are 9 months of formal training and 2 months of practical training. There are two semesters with an exam at the end of each. There is a three-day break between semesters and a one week holiday before exams. During Ramadan, the students are sent to their village with an assignment to complete a questionnaire. The instructors visit the students in their villages during this exercise taking care to arrive in the PM. The 1st semester is spent on ag subjects and the 2nd semester is spent on non-ag (extension, rural development, cooperatives). Classes run from 9-11 from 11:30-1:30 each day for six days/week. During the first two hours, an expert presents a lesson. During the second two hours, the same material is covered though a question and answer approach. Some emphasis is placed on having the students speak since this skill will be required in their extension jobs. Although this project may compromise on its requirements for prior formal training, a minimum level of maturity is required because those completing the program must proceed to function as extension officers. Our IBB school may have some more flexibility in that we will have a three-year period in which students can mature as contrasted to 11 months for the Taiz school. We have been invited to observe the classes in the FAO-Taiz school. There is some prospect that graduates of this extension school could enter the IBB school, perhaps starting in the 2nd year. Dr. Fuad cautioned against staffing the IBB school with nationals from a single country.
- D. Visit to British Veterinary School. The dedication of the new British Veterinary School was attended. At the ceremony, a class was also graduated. The new facilities are excellent with a variety of reproduction tools, all of British make. A private discussion was held with Mr. Eric Hall, the Principal Training Officer. They have had difficulty in getting applicants with adequate high school background and have had to lower their standards. All course materials have been prepared and reproduced in English and Arabic. The training is primarily along the lines of animal health care with the aim of

developing para professionals. A fair emphasis is placed on animal husbandry. The school is in the process of starting a dormitory. Our IBB school project can learn much from this project and we should seek their advice and study their program.

This ceremony also afforded the only opportunity to meet Mr. Mohamed Jagman, the Deputy Minister of Agriculture. He speaks English very well. Also met at this meeting was Mr. Abdulla Zabarah, the Ministry official responsible for Livestock programs.

V. EXTRACTS BASED ON VISIT TO THE MINISTRY OF AGRICULTURE

A. Conference with FAO Advisory Team. Mr. Kamal Mansour, Team Leader, was unavailable for our first visit to the Team Headquarters, but he was met on a social occasion and found to be a most cordial and eloquent person with a good command of English. He served as participant and translator during the second of two conferences with the Minister of Agriculture. Mr. Mansour is a Sudanese Economist who has been in Yemen five years. Deputy Team Leader, Mr. Nafar Orabi, a Syrian Horticulturalist, was also unavailable for our conference. We met with No. 3 Man, Mr. Ahmed Sayed, an Iraqi Agronomist. We did not meet team member Mr. R. Malek, a Pakistani Irrigation/Water Resources Specialist or a Junior Team Member who is a statistician. Also present at the meeting were a Yemeni, Mr. Mukvil Ahmed Mukvil, Director General of Planning for the Ministry and Counterpart of Mr. Ahmed Sayed), Mr. Yaya Shuga and Mr. John Young of the USAID Mission. Mr. Mukvil also serves as acting Deputy Minister of Agriculture in the absence of the Deputy. Mr. Sayed indicated that the Minister desires to strengthen existing projects being pursued by USAID and he specifically enumerated:

1. The Sorghum/Millet Project
2. The Horticultural Project
3. The Poultry Project

Sayed indicated that work on Sorghum/Millet could continue at Sana'a but that considerable expansion is needed in the Tihama.

Upon being asked, Sayed agreed that projects are needed to develop an Agricultural Faculty and a Water Resources program. He indicates a strong interest in extending the Poultry Project. He says that FAO now has a seed multiplication project.

Mukvil feels that not enough attention is being given to livestock especially from the standpoints of range management and the development of drought tolerant grasses.

Regarding documentation, the Five Year Plan was suggested as the best guidance for programs.

Wood suggested that it would be desirable for Mr. Mukvil to visit the USA. Sayed indicated that a formal invitation for such a visit would be in order.

Upchurch explained the Title XII Program and Woods explained CID. The meeting was cordial.

B. Conferences with the Minister of Agriculture, H.E. Ali Abdulla Al-Matari.

1. The first meeting was a brief introductory session attended by Huesmann, Young, Wood and Upchurch. Yaya Shuga served as interpreter. Huesmann explained Title XII and Upchurch described how the Universities might function. Huesmann indicated his desire to have the Title XII Program work directly with the Minister. Wood explained CID. The Minister was extended an invitation to visit the USA. The Minister seemed pleased to have the Title XII program evolving and no complications surfaced in the meeting. He offered to meet with us again in a few days after Upchurch and Wood had gained more insight. We accepted.
2. The second meeting dealt with substance. Present were Huesmann, Young Mansour, Sayed, Shuga, and Upchurch. Mansour translated.
 - a. The Minister looks forward to arrival of the Design Team in late March. He wants them to talk with all concerned and to propose new projects, to project completion of existing USAID projects and to consider coordination of projects.
 - b. The mountain areas need special attention and policy dictates more attention to these areas especially from the standpoint of water resources.
 - c. The Minister feels that more attention to water resources is in order especially from the standpoint of proper usage.
 - d. More attention is needed for Range Management - study, evolve policy.
 - e. He wants more emphasis on Sorghum/Millet in the producing areas and especially at Al Jeruba.
 - f. He emphasizes the need for some Arabic language capability in the various projects.
 - g. The YARG wants to continue the USAID Poultry Project and does not presently have the capability. Help is needed from Title XII here.
 - h. The Minister has not decided which Ministry personnel to send for training under USAID sponsorship. Huesmann has training funds available and would like to use CID Universities. The Minister hopes to decide in the next few weeks. We discussed the problem of English capability. Upchurch indicated that Degree and Certificate programs are different with the latter requiring much less English capability. Huesmann is also willing to send people to Universities where Arabic is the language used. There are now 25 USAID sponsored students in Arabic Universities.
 - i. The Minister indicates that a severe shortage of counterparts prevents more people from being released for training.
 - j. In a closing statement, the Minister restated that considerable emphasis must be given to sorghum/millet which occupied 70% of the land and provides food and feed. Some quick results are needed. Farmers are asking for better varieties. He wants a breakthrough. We must identify the best native varieties and evaluate varieties from other countries.

IV. SUMMARY OF VISITS TO USAID MISSION PROJECTS AND TO OTHER DONOR PROJECTS

A. Training Programs were discussed with Edwin Tolle of the Mission. Tolle reports that 53% of the Yemeni students sent to AUB last year successfully completed the course. To plan a program in the USA for Dr. Mohamed Al Harazi, Tolle suggest we call Thomas Ball, the Branch Chief for Academic Training, USAIDW. Mr. Mohamed M. Al-Sanahani is currently scheduled to take up training in Soils at the MS level at the University of Arizona. Dr. Nasser Aulugi has now finished his Ph.D. training as an Ag Economist in the USA and is serving as a Professor of Economics at the University of Sana'a.

B. Visit to IBRD-FAO Project at Taiz. (See Section IV-C for Educational Aspects)

Conferred with Dr. Jamal Fuad, recently arrived Director. He has BS, MS, Ph.D from N.C. State University, University of Maryland and University of Minnesota respectively. He indicates Mansour will have 9 technical people in Sana'a and that there will be 14 at Taiz. They have funds to hire short term specialists Fuad's predecessor left nine months ago. The project is now newly funded with a considerably extended life. There will be considerable emphasis on national coordination. Great skill will be required in this coordination as other donor agencies do not appear to have been consulted in advance about the coordination which is to be performed. Fuad sees a challenge in meshing daily programs of work with the normal work patterns of individuals hired locally. Fuad seems to have great perception in such matters and he is anxious to evolve a more dynamic program. We will be well advised to study his methods and results.--Fuad now has work on Soils, Horticulture, Agronomy, Plant Nutrition and Plant Protection. Next year he will add Irrigation and Farm Irrigation and Farm Mechanization. He visualizes considerable interest in minimum tillage. His program for the present excludes Forestry, Fruits/Vegetables, Marketing, Credit, Cooperatives, Food Processing, Human Nutrition, Animal Work, Formal Education, Range Management and Forages. He visualizes sponsoring a network of 5-7 Experiment Stations nation-wide. Some professionals would be at these sites. Fuad suggested that USAID might wish to equip the research stations. Fuad suggests we get "Interim Report of Project Yemen 73/010 - The Central Agricultural Research and Training Project, Taiz" issued June 1978 by FAO - Rome - prepared by Fuad's predecessor, Mr. Smith (an Australian). For other publications, he suggests we confer with the Yemen Country Project Officer - FAO - Rome - Mr. Sanders or his Alternate, Mr. Shawki.

C. Appropriate Technology. Mr. John Young, Mission Ag Officer, indicated briefly the nature of an Appropriate Technology Project which the Mission is proposing to undertake. The next step is to write a Project Paper. This project will be in the Ag Section of the Mission. It appears that this project will have some implications for ag and non-ag sectors. Further discussions are needed to define the relationship between this project on Appropriate Technology and the Title XII Program.

D. USAID Project. Visit to Mr. Leo Sankoff, COP, Mr. Tom Meyer and Dr. John West, Associate Dean, Cal Poly University. This project has been brought to the verge of success through several years of difficult work. There are 79 groups of ready-to-lay pullets (10-300 birds/flock) which have been placed in the countryside in four provinces. The project is now set to continue training

of Yemeni practitioners on a sustained basis. This project is badly needed in the country and it is well received. The Ministry is anxious to continue the project but needs continued help. Cal Poly Personnel indicated a willingness to consider continuing some association with the project under Title XII sponsorship if so requested.

The Dutch have a similar project but with emphasis on broilers. Their project has met with limited success perhaps because of a need for more emphasis on training.

E. German Rural Development Project. Mr. Werner Moosbrugger, Project Leader, was visited in his combination home/office in Sana'a. Also present was Mr. Konrad Engleberger who runs the German RD Farm in Ameron Valley (70 Km north). This team has collaborated with us in the growing of some plants. They are willing to collaborate within the limits of their capability. Their Project occupies an area 15 Km x 15 Km in the area Ameron to Rada. They have housing for expatriates, 14 Ha of land (1/2 arable) and a deep well. The Ministry of Ag would like their Project extended. The first 2 year phase will be up May 1979. In this limited area, their goals have been:

1. Develop a practical project on applied research and demonstration.
2. Set up an extension organization (difficult due to lack of staff).
3. Carry out a feasibility study to give recommendations as to what can be implemented in agricultural improvement starting January 1981.

They want to add activities on improvement of agricultural irrigation facilities and on infrastructures (roads, water systems). A survey is being made of 120 villages with all families in 10 villages being interviewed regarding farming practices.

Their Extension man is Mr. Loeschner. Their Agro-Economist is Mr. Rethwilm. He will leave in May and be replaced by a Civil Engineer. They look for possible expansion in January 1981 and at that time may add a Livestock Specialist and a Civil Engineer for roads and irrigation.

The German Rural Development Project and the German Plant Protection Project have the same home Institute in Germany. The Germans also help in Public Health (NIPI).

In the German RD area there are only two official LDA's and they are not functional yet.

Moosbrugger works with Mr. Ismail Mutamakil who is Director General of Agricultural Services in the Ministry of Agriculture. He is very helpful and handles Irrigation, Forestry, Horticulture and Field Crops.

F. Charles Uphaus, Mission Ag Program, indicates that there is a Mission Plan which could be useful to the Design Team.

G. General Information from John Young, Mission Ag Development Officer.

1. The Livestock Development Corporation is supported by the Kuwait Fund and IBRD. The Head is Mr. Kim Kuneman. This organization is located physically with the ministry. They are concerned with Fattening Cattle, Range Management, Dairy Production and Poultry Development. The British

Vet Group is a part of the Livestock Corporation. The Range Management Section has a unit on Forestry but not much actively is contemplated. More details are needed on the scope, status and projections for this Program.

2. The Dutch have a new program at Hodeida on extension seed introduction. Not much is known about this project.
 3. The British have a Forestry Project in a Rural Development Effort at Damar.
 4. Wallace Swanson is the Mission employee working on the Mawhitt Project.
 5. The Australians have a Mr. Lamont at Damar working on the Livestock Project and a representative also at Wadi Surdud working on Forages.
- H. Conference - Frank Pavich, USAID Rural Development Officer.

The Governates (Provinces, States) in Yemen are divided into Nahirs (NAYAHYA). Each Nahir has a Local Development Association (LDA). Each LDA elects 3 officers - Head, General Secretary, Deputy Secretary. The National Ministry of Labor, Youth and Social Affairs charters the LDA's but the LDA's are independent and do not rely upon the Government. Funds to support the zakat tax on the agricultural sector come from the ag sector.

Each year, a Nahir representative assesses each farmer's worth and his tax is established to be paid in money or in kind. The LDA gets 75% of this return. The Tax Collector gets 15% and 10% goes to the Minister of Finance.

LDA's are in a National Union-Confederation of Yemen Development Associations (CYDA)

All Heads of LDA's in a Governate are members of a Coordinating Council. These members elect a head (Head of LDACC) and also a General Secretary and a Deputy Secretary. The Governor of the Governate is the Honorary Head. The ten Heads of LDACC meet in Sana'a and are the National Assembly. They elect a Head who is President of CYDA. The honorary President is the President of the County.

CYDA gets 5% of the Customs Duties collected in Yemen plus another small tax. CYDA can also get funds from foreign donors. All work with LDA's must be through CYDA.

LDA's are an extension of tribal patterns sanctioned about 1968. CYDA came into being about 1973. CYDA has just been given 100 million Rials to form a Bank. CYDA provides technical assistance, guidance, advice, and representation at the national level. In some cases, LDA's work well, in others they do not. Each LDA has a five year plan (most exist). They work in four major areas - water (cistern) roads, health, education. LDA's just got into the cooperative business a year ago. This is being encouraged. LDA's can get exemption from import duties.

USAID in its Rural and Capital Development Program has 2 engineers, 1 RD officer and 1 Capital (loan) Development officer. This Program has a great challenge to gain a good reputation with CYDA because of the long lead time required for developing projects. The overall RCD Program:

1. Have a small water system - domestic - done by engineers
2. Community Development in one LDA - Health, Ag, Roads, Education (in Mahweet)
3. A Proposed Project - for 2 governates, Roads, Water (Project Paper available).
4. Prospects for income generating projects.

Frank emphasizes the need for having some Arabic language capability in each project.

I. Conference, David J. Gephart - Engineer - USAID Mission - Re Water in Yemen.

Donors have studied the 7 wadis in the Tihama to some extent. Zabid, Surdud and Rima have been studied most thoroughly. Each study is a separate undertaking. The British and Americans have been involved. Reports should be available. Studies in other wadis are probably underway.

Present USAID Program - A water survey was started in North Yemen in FY73. This was tied to the Ministry of Ag but Ag had no funds or people and hence has never had an active program. This was operated by USGS for USAID. In the 3rd year, the Project Manager looked for a home for the Project and the YARG placed it with YOMINCO (Yemen Oil and Mineral Corporation).

There is a new project getting underway. It involves institutional building. There will be developed a DOH (Dept. of Hydrology). This project will run 4½ years and will result in:

DOH - Surface Water, Ground Water, Water Quality, Data Collection/Processing.

Now have 7 people will go to 30 in 4½ years. This unit will continue collection of data in the three wadis already studied. Eventually there will be an Inter-Ministry Council. This is just in the talking stages now.

We can now draw rough maps of the country as to water status but sustained water yields are difficult to project at this line.

The World Meteorological Organization (WMO) (of UN) is here under Aviation Sponsorship but they are collecting some rainfall data, also wind (runoff??). They have an agrometeorologist.

The Ministry of Ag also has a charge by a Council to get involved in hydrological water status.

Projections for Five Years:

1. No uniform water policy in five years.
2. Any uniform policy established in five years would be difficult to enforce.
3. Water mining is ongoing - this is in the hands of the private sector - use is on a high value crop.
4. Wells developed to support a high value crop may provide some extra water to villages or for other crops.
5. Urban areas (5-6) are developing well fields. There will be about 15 such fields eventually. This comes under the National Water and Sewage Program.

Beyond Five Years - ???

Rural water is under Public Works. There is much money in this system from many donors for developing small village water systems.

A Japanese group is doing a Master Plan for Haja (NW of here). The Swiss are also making a study.

There are Islamic water laws which need consideration.

Dave has a copy of a water report which will be useful to the Design Team.

- J. Visit with GSO Tom Reilly and Asst. GSO Dave Lawson. About two hours were spent inspecting warehouses and discussing the support function. Obviously, the support function will be a great challenge.

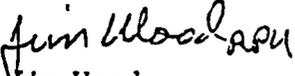
VII. Preliminary Observations of Upchurch and Wood Conveyed to Director Huesmann.

- A. Although there is much Donor activity in Yemen in Agriculture, much of it is on a local, specialized or restricted basis so that reasonable major roles are left for assumption by a Title XII Program. Although the IBRD-FAO Advisory Team is charged with a coordinating role both Co-Directors (Mansour and Fuad) take a cooperative stance and the limitations on their resources leaves much room for additional leadership to evolve. The key to success in a Title XII Program appears to be the prompt demonstration of a capability to perform promised results.
- B. The IBB school and its projected companion at Surdu are feasible projects for a CID Title XII contract and these projects are compatible with other Donors activities.
- C. The Development of an Agricultural Faculty for a College of Agriculture is a task not yet assumed by any Donor and it is a project ideally suited to CID Universities. While such a project could be considered not of the highest priority for full implementation at present, it should be considered a high priority from the standpoint of gaining adequate lead time on long range aspects (policy decision on location, institutional relationships, development of key faculty, etc.). It is inevitable that pressure will mount to form such a Faculty and therefore advanced planning is needed to guide the interest which will develop.
- D. A Comprehensive Plan for water resource definition, allocation and development represents a high priority item which CID Universities are uniquely equipped to manage. Although there has been some activity in this area, Agriculture is not playing its appropriate role and there is a considerable void to be filled.
- E. There does not appear to be an effort to design and develop the national institutional components required for an effective Extension Service. Some lower level components of extension are being addressed. The Design Team should give special consideration to this void and to the role which Title XII might play here. Possible institutional settings need to be examined including the possibility of embracing Extension in a Rural Development Program at the Ministry level.
- F. While a Nationally Coordinated Agricultural Research Program is not now a reality, the IBRD-FAO Advisory Team proposes to undertake such coordination and they have some resources available. The proper role for Title XII here is probably one of accepting specific major (even if incremental) responsibilities as these can be defined. The impact of Title XII in a national research program will grow as projects are effectively assumed and operated.
- G. There is an urgent and growing need for a National Agricultural Information Center (Library?). This void could be filled by Title XII with a high visibility program in the Ministry or as a free standing unit linked to the Ministry but as a projected component of a College of Agriculture. The Design Team effort will involve assembling the rudiments of printed documents necessary to start an Information Center.

- H. The concept of using a Core Team as a key facet of the Title XII Program appears feasible and desirable. This will allow for a team to develop new program segments and will allow for the furnishing of experts to projects designated by the Ministry of Agriculture on short notice. The experts can come from the core team itself or experts can be quickly accessed from CID Universities. This rapid response approach is much favored by the Ministry and others. Obviously, some specific level of effort will need to be defined for this function less the Title XII Program become a supplier of bodies to other programs.
- I. Several Projects need clarification. The Design Team should examine more closely Forestry, Range Management, Goat Production, On-shore fish production, rabbit production, and Dune stabilization.

VIII. Conclusions. The observations made herein serve to illustrate in a preliminary way what the Design Team must cover. More detail is needed on the various projects mentioned and the preliminary observations and conclusions recorded herein need to be considered more carefully and amplified as necessary.


R. P. Upchurch
University of Arizona
Design Team Leader


Jim Wood
CID Projects Officer

Distribution:

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Dr. Bruce Anderson - CID
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Mr. Morris Whitaker - BIFAD
Mr. Russell Olson - USAID
Mr. Robert Huesmann - "
Mr. John Young - "
Dr. John Fischer - AUB
Dr. James Hensen - WSU
Dr. Donal Johnson - CSU
Dr. Howard Peterson - USU
Dr. Stanley Miller - OSU

FACULTY OF AGRICULTURAL AND FOOD SCIENCESList of Faculty and StaffOctober 1978Officers of the Faculty

Harold E. Hoelscher, Ph.D. - President of the University
 John L. Fischer, Ph.D. - Dean of the Faculty
 Muhad J. Dagher, Ph.D. - Associate Dean
 Fuad Haddad, Ph.D. - Registrar

Program Coordinators

Eros E. Barnard, Ph.D. - Graduate Studies
 Masri S. Kavar, Ph.D. - Undergraduate Studies

Professors Emeriti

Gordon Ward, Ph.D. - Professor of Agricultural Economics
 Wallace Worzella, Ph.D. - Professor of Agronomy

Professors

- * 1. Salah Abu-Shakra, Ph.D., Oregon State University, Professor of Agronomy; appointed January 1965.
2. Joseph Asmar, D.V.M., Ecole Veterinaire de Lyon; Ph.D., University of California, Adjunct Professor of Veterinary Medicine.
- * 3. Muhad J. Dagher, Ph.D., Iowa State University; Professor of Poultry Science and Nutrition; appointed July 1962.
4. John L. Fischer, Ph.D., University of Wisconsin; Professor of Agricultural Economics and Rural Development; appointed July 1978.
- * 5. Fawzi Al-Haj, Ph.D., University of Wisconsin; Professor of Extension Education and Chairman, Department of Agricultural Economics, Business and Extension; part-time, appointed July 1966.
- * 6. Harry D. Henderson, Ph.D., University of Minnesota; Professor of Agricultural Mechanization and Chairman, Department of Soils, Irrigation and Mechanization; appointed November 1967.
- * 7. Masri S. Kavar, Ph.D., Pennsylvania State University; Professor of Entomology; appointed July 1963.
8. Salim W. Macksoud, D.E., University of California; Professor of Irrigation; part-time, appointed December 1951.

* On Tenure

R. P. Upchurch met for detailed discussion January 23, 1977

- * 9. Abdur-Rahman Saghir, Ph.D., University of California; Professor of Weed science and Chairman, Department of Crop Production and Protection; appointed October 1964.
- 10. Abdul Munim Talhouk, Dr. Rer. Nat., University of Munich; Adjunct Professor of Economic Entomology.

Associate Professors

- 1. Nicolas J. Atallah, D.E., University of California; Courtesy Associate Professor of Irrigation.
- * 2. Enos E. Barnard, Ph.D., University of Wisconsin; Associate Professor of Horticulture; appointed September 1963.
- 3. Shawkat Chaudhry, Ph.D., Washington State University, Adjunct Associate Professor of Plant Taxonomy.
- * 4. Abdul Hamid Hallab, Ph.D., Louisiana State University; Associate Professor of Food Technology and Nutrition; part-time, appointed July 1968.
- * 5. Adib Saad, Ph.D., University of Wisconsin; Associate Professor of Plant Pathology; appointed July 1965.
- * 6. Antoine H. Sayegh, Ph.D., Oregon State University; Associate Professor of Soils; appointed September 1964.
- * 7. Raja I. Tannous, Sc.D., Massachusetts Institute of Technology; Associate Professor of Food Technology and Nutrition and Chairman, Department of Food Technology and Nutrition; appointed October 1963.
- 8. Salah Yacoub, Ph.D., Cornell University; Courtesy Associate Professor of Rural Sociology.
- 9. Abdellatif El-Zein, D.V.M., Veterinary College, University of Toulouse, France, Ph.D. Animal Virology, University of Illinois; Associate Professor of Veterinary Medicine and Chairman, Department of Animal Production and Protection; appointed September 1978.

Senior Lecturer

- 1. Paris Andreou, Ph.D., University of Leeds, Senior Lecturer in Agricultural Economics; appointed October 1977.

Assistant Professors

- 1. Wahla Baba, Ph.D., American University of Beirut, Assistant Professor of Nutrition; part-time, appointed October 1977.
- 2. Isam Bashour, Ph.D., University of California; Adjunct Assistant Professor of Soils.

3. Shawky M. Dagher, Ph.D., University of Massachusetts; Assistant Professor of Food Technology and Nutrition; part-time, appointed December 1972.
4. Khaled Makkouk, Ph.D., University of California; Assistant Professor of Plant Pathology; part-time, appointed July 1977.
5. Adnan M. Miski, Ph.D., University of California; Assistant Professor of Nutrition; part-time, appointed October 1975.
6. Musa Nimeh, Ph.D., Utah State University; Assistant Professor of Irrigation; appointed January 1977.
7. John Ryan, Ph.D., University of Dublin; Assistant Professor of Soils, appointed August 1975.
8. Wajih Sawaya, Ph.D., Washington State University; Adjunct Assistant Professor of Food Technology.
9. Fawak Sleiman, Ph.D., Michigan State University; Assistant Professor of Animal Production and Director, AREC, appointed November 1976.

Lecturers

1. Kamal F. Daouk, M.Sc., American University of Beirut; Lecturer in Horticulture; part-time, appointed November 1976.
2. Nazeeh Abdul-Hadi, Ph.D., Kansas State University; Courtesy Lecturer in Horticulture.

Instructor

1. Hour K. Dajani, M.Sc., American University of Beirut; Instructor in Rural Sociology; part-time, appointed November 1976.

Advisors

1. Hugh Austin, M.S., Louisiana State University; Adjunct Advisor in Analytical Chemistry.
2. Talat Dada, M.S., American University of Beirut; Adjunct Advisor in Agricultural Economics and Development.
3. Yasir Saadi, M.S., American University of Beirut; Adjunct Advisor in Agricultural Economics and Development.
4. Hanna Sarkis, M.S., American University of Beirut, Adjunct Advisor in Crop Production.

Research Associates

1. Saab Abi-Saab, Ph.D., All Union Research Institute of Animal Breeding; Courtesy Research Associate in Animal Production and Protection.
2. Hovsep Khatchadurian, M.S., American University of Beirut, Adjunct Research Associate in Food Technology.
3. Habil Rifai, Ph.D., The Agricultural University of Mitra; Courtesy Research Associate in Agricultural Mechanization.

Senior Research Assistants

1. Ramona Fares, B.Sc. Medical Technology, the University of Toledo; Senior Research Assistant in Animal Production and Protection; appointed July 1970.
2. Ghada Feghali, B.Sc. Pharmacy, American University of Beirut; Senior Research Assistant in Crop Production; appointed August 1972.
3. Fossy Shadarevian, B.S. Pharmacy, American University of Beirut, Senior Research Assistant in Food Technology and Nutrition; appointed July 1961.
4. Michel Uwayjan, M.S. Agriculture, American University of Beirut; Senior Research Assistant in Animal Production and Protection; appointed October 1964.

Research Assistants

1. Elie Barbour, M.S., A.U.E., Adjunct Research Assistant in Animal Production and Protection.
2. Arpy Barsoumian, M.Sc. Plant-Soil-Environmental microbiology, Mount Holyoke College, Mass., Research Assistant in Soils; appointed July 1978.
- + 3. Wafa Birbari, B.Sc. Public Health, American University of Beirut, Research Assistant in Food Technology and Nutrition; appointed November 1977.
- + 4. Baria Budayr, B.Sc. Agriculture, American University of Beirut, Research Assistant in Crop Production and Protection; appointed February 1978. (Casual).
- + 5. Huda Maddad - B.S. Agriculture, American University of Beirut, Research Assistant in Animal Production and Protection; appointed December 1977.
- + 6. Lina Khatib - B.S. Agriculture, American University of Beirut, Research Assistant in Food Technology and Nutrition; appointed December 1977.
- + 7. Sawsan Kreidieh - B.S. Biology/Chemistry, American University of Beirut, Research Assistant in Food Technology and Nutrition; appointed November 1977.
- + 8. Hay Kurban - M.S. Agriculture, American University of Beirut, Research Assistant in Crop Production and Protection; appointed March 1978.

+ Supported by grants

On one-year leave as of November 1978.

9. Khalil Milki - M.S. Agriculture, American University of Beirut, Research Assistant in Crop Production and Protection; appointed October 1977.
- +10. Samir Mukhayish - B.S. Agriculture, American University of Beirut Research Assistant in Soils and Irrigation; appointed February 1978.
11. Henriette Mussali - M.S. Food Technology, American University of Beirut, Research Assistant in Food Technology and Nutrition; appointed July 1977.
- +12. Imad Haffar, B.S. Agriculture, American University of Beirut, Research Assistant in Crop Production and Protection; appointed October 1978.
13. Devi Prasad, M.S. American University of Beirut; Adjunct Research Assistant in Soils.
14. William Safi, M.S., American University of Beirut; Adjunct Research Assistant in Food Technology and Nutrition.
- +15. Alfred Salib, B.S., American University of Beirut; Research Assistant in Food Technology and Nutrition; appointed September 1978 (casual,
- +16. Haykal Sawaya, B.S., Agriculture, American University of Beirut, Research Assistant in Soils and Irrigation; appointed February 1978.
- +17. Selim Shehab, B.S., Chemistry, Lebanese University, Research Assistant in Crop Production and Protection; appointed January 1978.
18. Farouk Sleimna, Doctorat 3e Cycle Botany, University of Paris; Visiting Research Assistant in Plant Pathology.
- +19. Adnan Umar, B.S., Chemistry, American University of Beirut; Research Assistant in Food Technology and Nutrition; appointed May 1978.
- +20. Varoujan Vartanian, M.S., Plant Pathology, American University of Beirut; Research Assistant in Crop Production and Protection; appointed October 1978.

+ Supported by grants

Automobile Rental - Sanaa, Yemen - January 1979

No automobile rental agencies could be located in Sanaa at this time.

Individual automobiles (taxis) with owner-driver are readily available.

1. A large Toyota Land Cruiser (with owner-driver) is currently priced at about YR 300 (\$66.00) per day for Sanaa and close vicinity regardless of mileage.
2. This same large Toyota Land Cruiser (with owner-driver) is currently priced at about YR 400 (\$88.20) per day for out-of-town travel regardless of mileage.
3. Smaller sedan type cars (with owner-driver) are currently priced at YR 250 (\$55.13) per day for Sanaa and close vicinity regardless of mileage.
4. This same small sedan type vehicle (with owner-driver) is currently priced at YR 350 (\$77.18) per day for out-of-town travel regardless of mileage.
5. In situations 2 and 4 the driver-owner would take care of his own personal travel expenses (per diem) from the YR 400 and YR 350 respectively.
6. In all situations of 1 thru 4 the daily rate includes all gas, oil, repairs, etc.
7. We were unable to locate at this time any owners willing to rent out their vehicles alone -- without their going as driver.
8. There is not much chance of getting an owner-driver who can speak English and also act as interpreter.
9. I suggest you add 30% to these prices annually for inflation.

/s/ R. L. Voigt

Prepared by:
M. Swelem & F. Sileem
Extension Training Experts

IBRD/FAD AGRICULTURAL PROJECT - TAIZ, YEM

According to the training facilities it is decided to accept 60 trainees in the fifth centre in this year 1979, on condition of having the preparatory school certificate at minimum, rural originality, having the interest to work in rural areas, desirable attitude towards the extension service and readiness for working in this field for five years at least after their graduation.

The training programme:

This training programme is considered a pre-service training for preparing extension officers. So its period continued for 11 months. After this period the trainees have a training certificate for working as extension officers with the Ministry of Agriculture.

Before setting this training programme several meetings were conducted between the training board in the project and the responsible persons of the extension service in the Ministry of Agriculture plus the supervisors of the extension staff in SURDP, for evaluating it.

As a result of these meetings it was found that the training curriculum should have some new agricultural subjects beside increasing the practical training period on some agric. practices.

So these comments and others revealed in the evaluation study made in the previous training programme were taken on consideration in setting the training curriculum this year as follows:-

1. A daily studying will be conducted along the nine months of the centre except Fridays and holidays.
2. The daily studying will be on two periods, from nine to eleven and from eleven thirty to one thirty.
3. The training programme is divided into Theoretical subjects and practical ones plus some field visits and practical practices. The percentage of field visits and practical practices reached about 50% from the total period of the centre.

I. The theoretical subjects:

a. The orientation stage: it contains general information about the project and its activities and goals, the importance of agriculture in Yemen, animal production in Yemen, problems faced by agricultural production, and the cultural history of Yemen.

b. The agricultural stage: it includes Plant Morphology, factors needed for plant growing such as soil, climate, irrigation fertilizers, pest control and mechanization plus field and horticulture crops production and animal & poultry breeding and veterinary subjects.

c. The extension stage: it contains definition of extension service, its beginning and development in the different countries of the world, some models of extension systems, aims and philosophy of extension, its principles and methods, spheres, descriptions of its leaders and responsible, planning for its theories and evaluation of its activities.

d. Other sciences connected with the extension service stage: it includes general information about some scientific subjects connected with the extension service such as rural sociology, Agric. co-operation, Agric. credit, rural service, Home economic and Agric. Statistics... etc.

II. Practical training and field visits:

It contains the following:

a. Practical training: it includes training on farm practices and extension methods, plus audio visual aids such as using agriculture tools and how to maintain them, preparing soil for sowing, preparing nurseries for sowing vegetable and fruit crops, doing grafting and pruning, transplanting, fertilizing using sprayers and dusters, mixing pesticides and making emulsions, vaccination for animal and poultry, operating audio-visual aids, holiday extension meetings, recording, writing extension reports...etc.

b. Field visits: it contains visits to authorities and agencies official and non official working in agricultural field, visits to some villages for identifying their ~~own~~ activities, and how to communicate

with its organizations, visits for informational offices, training on how to apply the different extension methods in the field and how to obtain data from the rural communities.

All the mentioned theoretical and practical subjects will be covered by the project's experts UN Volunteers and Yemeni Specialists plus some experts from the other projects such as SURDP and the British station for mechanization.

We also put in consideration re-explaining all the theoretical subjects of the agricultural stage for more simplifying and adaptation for the trainees.

The following is a table showing the number of days which every stage needs:

Stage	No. of days
Orientation stage:	6 days
<u>Agriculture Stage:</u>	
Plant Production:	
1. theoretical	45 days
2. practical	44 days
Animal production:	
1. theoretical	9 "
2. practical	10 "
Extension Stage:	
1. theoretical	23 "
2. Practical	16 "
Other Science:	
1. Theoretical	17
Practical Training and Field Visits:	
Training on driving motor cycles	64 "
	7 "

The period through November and December months after the trainees graduation will be specialized for a practical training on farm practices in Ausseifera and Ibb farms for increasing the trainees agric.practices, and also for training on driving motor-cycles.

4

Curriculum of Training Course for Extension Officers

Fifth Centre Year 1979

1. Orientation Stage:

Day	Date	Lectures	Time		No. of	No. of
			From	to	hours	days
Sat.	3.2.79	Inauguration day	9	10.30	1.30	
		Registering the trainees	11	1	2	
Sun.	4.2	Acknowledgement with the Research station and SURDP	9	11	2	
		Explanation of the programme and the system of training	11.30	1.30	2	
Mon.	5/2	Importance of Agric. in Yemeni economy.	9	11		
		Animal Production and the importance of integration between plant and animal production	11.30	1.30		
Tues.	6/2	Problems of Agric. production in Yemen.	9	11	2	
		Agric. development aims and its different projects in Yemen.	11.30	1.30	2	
Wed.	7/2	Agricultural history in the world.	9	11	2	
		Agric. mechanization	11.30	1.30	2	
Thurs.	8/2	Agric. rotation	9	11	2	
		Cultural history of Yemen.	11.30	1.30	2	
Sat.	10/2	Holiday (Prophets's birthday)				1
Sun-Tue	11-13/2	Plant morphology and the environmental needs for its growing	9	1.30	12	3
Wed-Thur	14-15/2	Practicals on different parts of the plants.	9	1.30	0	2
Sat-Thur	17/2 - 1/3	Soil subjects:- soil definition, formulation, fertility, maintenance, reclamation, different kind of fertilizers, how to take soil samples and practical training in the laboratory and field.	9	1.30	40	12

5

II Agricultural Stare:

Day	Date	Lectures	Time		No. of hours	No. day
			From	to		
Sat.-Thur	3-8/3	Different system of irrigation with practical training on different machines	9	1.30	24	6
Sat.-Tues.	10-13/3	Field crops growing in Yemen	9	1.30	16	4
Wed.-Thurs.	14-15/3	Cultivating sorghum and maize	9	1.30	8	2
Sat.-Sun.	17-18/3	Field work on preparing the land for planting field crops	9	1.30	8	2
Mon.-Tues.	19-20/3	Cultivating wheat and barley	9	1.30	8	2
Wed.-Thur.	21-22/3	Field training on preparing the land and planting sorghum wheat and barley in the training field.	9	1.30	8	2
Sat.-Mon.	24-26/3	Principles of animal breeding and demonstration visits to some animal breeding stations.	9	1.30	12	3
Tue.-Thur	27-29/3	Veterinary, animal diseases protection and control.	9	1.30	12	3
Sat.-Sun	31/3-1/4	Poultry breeding	9	1.30	8	2
Mon.-Tues.	2 - 3/4	Accompletion of Animal diseases, subjects.	9	1.30	8	2
Wed.-Thur	4 - 5/4	Animal and poultry feeding.	9	1.30	8	2
Sat.	7/4	Milk Production	9	1.30	4	1
Sun.-Thurs	8-12/4	Agric. mechanization and its maintenance with practical training on ploughing with tractors.	9	1.30	20	5
Sat.-Tun.	14-17/4	Cultivating vegetables	9	1.30	16	4
Wed.-Thur.	18-19/4	Field training on preparing and sowing vegetables nurseries	9	1.30	8	2
Sat.-Tuo.	21-24/4	Cultivating fruit crops.	9	1.30	16	4
Wed. Thurs.	25-26/4	Field training on preparing and sowing fruits' nurseries.	9	1.30	8	2

Day	Date	Lectures	Time		No. of hours	No. of days
			From	to		
Sat.	28/4	Cultivating coffee	9	1.30	4	1
Sun.	29/4	Field training on preparing coffee nursery	9	1.30	4	1
Mon.	30/4	Frost trees different kinds and how to sow it.	9	1.30	4	1
Tue.-Thurs.	1-3/5	Field training on pruning, grafting and transplanting fruit crops.	9	1.30	12	3
Sat.	5/5	Modern Bee-Keeping	9	1.30	4	1
Mon.	7/5	Animal leather	9	1.30	4	1
Tue.-Thur.	8-10/5	Revision to the previous subjects.	9	1.30	12	3
Sat.-Thur.	12-15/5	Practical and field training in Ausseifera and Ibb farms.	9	1.30	24	6
Sat.-Sun.	19-20/5	Fertilizers, how to cultivate its quantity based on the research recommendations.	9	1.30	8	2
Mon.-Mon	21-28/5	First semester exam vacation	-	-	-	7
Tues.-Thur.	29-31/5	First semester exam.	-	-	-	3
Sat.-Thos.	2 - 5/6	Economy of insects, important insects found in Yemen, its different kinds and how to control different kinds of insecticides.	9	1.30	16	4
Wed.-Thurs.	6-7/6	Locust and how to control	9	1.30	8	2
Sat.-Tues.	9 - 12/6	Practical training on how to know symptoms infestations with insects on the plants, preparing emulsions and using sprayers and dusters.	9	1.30	16	4
Wed.	13/6	Holiday				1
Thurs.	14/6	Recreation Day				1
Sat.-Thurs.	16-21/6	Plant diseases - the different diseases found in the area - its protection and control.	9	1.30	24	6
Sat.-Tues.	23-26/6	Field training on identification of the symptoms of infestation with diseases on different crops and how to use pesticides.	9	1.30	16	4

Day	Date	Lectures	Time		No.	Days
			From	to		
Wed.-Thurs	27-28/6	General Revision	9	1.30	8	2
<u>III Extension Stage</u>						
Sat.	30/6	Extension definition	9	1.30	4	1
Sun.	1/7	How Extension system began in the world.	9	1.30	4	1
Mon.	2/7	Aims and philosophy of Extension	9	1.30	4	1
Tues.	3/7	Models of international extension organizations	9	11.30	2	
		Principles of extension service	11.30	1.30	2	
Wed.	4/7	The relationship between Exten. Economics, home economics and co-operation.	9	11	2	
		The relationship between Exten. Research and physiology .	11.30	1.30	2	
Thurs.	5/7	The role of Exten. in rural development.	9	1.30	4	1
Sat.	7/7	Spheres of extension work	9	1.30	4	1
Sun.	8/7	Theories of communication, education and adoption.	9	11	2	
		Extension teaching methods	11.30	1.30	2	
Mon.	9/7	Individual methods	9	11	2	
		Group methods	11.30	1.30	2	
Tues.	10/7	Demonstration methods	9	11	2	
		Demonstration fields	11.30	1.30	2	
Wed.	11/7	Mass media methods	9	11	2	
		Press and broadcasting	11.30	1.30	2	
Thurs.	12/7	Agric. meetings and conferences	9	1.30	4	1
Sat.-Wed.	14-18/7	Visit to agricultural projects in Sana'a area (ministry of Agr. German farm, fruit nursery, British veterinary laboratory, Frisian station and American Poultry Station				5
Thurs.	19/7	Evaluation and reports on the visit	9	1.30	4	1
Sat.	21/7	Local leaders	9	1.30	4	1

Day	Date	Lecturer	Time		No. of hours	No. of days
			From	to		
Sun.	22/7	Audio visual aids Planning extension programmes	9 11.30	11 1.30	2 2	
Mon.	23/7	Desirable characters of the extension officer	9	1.30	4	1
Tues.	24/7	Extension Evaluation Extension Training	9 11.30	11 1.30	2 2	
Wed.-Thur	25-26/7	Guide of recognizing the village	9	1.30	8	2
Sat.-Thur.	28/7-23/8	Practical extension training in villages under the training officers supervision				24
Sat.-Thur.	25-30/8	Barium holiday				6
Sat.	1/9	Revision on the extension methods	9	1.30	4	1
Sun.	2/9	Extension publications	9	1.30	4	1
Mon.	3/9	Responsibilities of the Extension officer	9	1.30	4	1
Tue.-Thur.	4-6/9	Practical training on using audio visual aids.	9	1.30	12	3
Sat.	8/9	Extension reports.	9	1.30	4	1
Mon.	9/9	Attending a local leaders meeting in a village	9	1.30	4	1
Tues.-Wed.	11-12/9	Revision the exten.subjects by the trainees	9	1.30	8	2
Thurs.	13/9	Visit to a village market for training on communicating farmers by using the loud speaker	9	1.30	4	1
Sat.-Tues	15-18/9	Visit to agricultural projects in Medeidah area (Tikama authority project, Sordud and Gemeisha farms and cotton ginner)				4
Wed.-Thur	19-20/9	Reports and evaluation on the trip	9	1.30	8	2
Sat.-Tue.	22-25/9	Field visits to SURDP Extension offices				
Wed.	26/9	Holiday (Revolution Day)				1



Day	Date	Lectures	Time		No. of hours	No. of days
			From	to		
Thurs.	27/9	Visit to an extension office	9	1.30	4	1
<u>IV Other Sciences connected with the ex service:</u>						
Sat.-Sun	29/-30/9	Rural sociology	9	1.30	8	2
Mon	1/10	Home economics	9	1.30	4	1
Tues.	2/10	Agric. economics Agric. marketing	9 11.30	11 1.30	2	
Wed.	3/10	Agric. co-operative	9	1.30	4	1
Thurs.	4/10	The rural organizations concerned with rural services, Agric. credit	11.30	1.30	2	
Sat.-Tues	6-9/10	Agric. statistics	9	1.30	16	4
Wed.-Thur	10-11/10	Practical training on preparing a speech in meetings	9	1.30	8	2
Sat.-Sun	13-14/10	Practical training on preparing ex. reports	9	1.30	8	2
Mon.-Thurs	15-25/10	Pre-final exam holiday				10
Sat.-Mon	27-29/10	Final exam.				3
Tues.-Thur	30/10-3/11	Holiday (Eid El Adha)				9
Sat.Mon	10/11-31/12	Practical training on some important agric. practices under the experts supervision including training on driving motor-cycles and attending some village meetings.				42

SECTION E
INDIVIDUAL TEAM MEMBER REPORT
REPORT
OF THE
DESIGN TEAM LEADER

1. Report on Design Team Procedures
2. Assumptions Underlying the On-Farm Water Management Activity and Suggestions for Monitoring the Activity
3. Individual Report by:

Donald G. Heckerman

October 1, 1979

REPORT ON DESIGN TEAM PROCEDURES

The Project Identification Document (PID) for the Agricultural Development Support Program contained a set of proposals which the Design Team was expected to evaluate and, where appropriate, to design specific activities to accomplish the objectives identified in the Document. These proposals included:

1. Core Activity

This activity will serve as the focal point of the Yemen Title XII Program and will have the following basic functions.

a. Coordination/Linkages

The project will serve as the focal point for high level contact with YARG institutions and other donor programs. It will be responsible for instilling in the YARG the basic understanding of the principles of modern agricultural development and providing advice on policy and legislative changes as required for the development of the sector. The project will coordinate closely with all donors to assure needed cooperation and integration of the overall program activities.

b. Basic Socio-Economic and Agricultural Research

The "core" will be responsible for the leadership and coordination of all technical research, and will serve as a continuing source of "shelf" research for the overall program, and also for the social and economic research and analysis required for effective program implementation. This element of the "core" will assist the Ministry of Agriculture in the development of a capacity for agricultural planning, sector analysis, and project design and evaluation.

c. Development of Satellite Activities

The "core" activity will pick up where the Contractor's design team left off and complete the final design of the satellite activities identified below.

d. Program Administration

The "core" activity will be responsible for the overall direction, administration and technical support of the Title XII Program. The "core" Chief of Party will also serve, along with a full time Yemeni counterpart as co-administrator of the Yemen Title XII Program.

e. Institutional (U.S.) Backstopping

Institutional backstopping will be a key element. Such backstopping will include a significant portion of faculty time devoted to Yemen-related research as well as TDY and on-campus research in support of specific in-country activities; encouragement of graduate work in Yemen-related research (agronomic, economic, social); frequent observation visits by Yemeni and institutional staff under institutional auspices; maintaining relations with international research institutions and support of in-country teams with current information from these centers; and arranging and overseeing appropriate training programs for Yemenis under the Program.

f. Yemen Title XII Board

Administration of the Yemen Title XII Program provides for the establishment of a Yemen Title XII Board including representatives from the Ministry of Agriculture, the YARG Central Planning Organization and other line ministries associated with the Program, officials of Contractor (including representatives of individual universities) and representatives of USAID/Yemen and relevant AID/W offices.

2. Satellite Activities

Satellite activities will be limited to those discussed below. The activities have been identified by USAID/Yemen as those which are critical to successful agricultural development in the Yemen context, closely tied to YARG national development priorities and objectives, supportive of AID's development strategy in Yemen and within the purview of the unique competence of the U.S. land grant system.

a. Ibb Agricultural Training Center (Ibb/ATC)

The Ibb/ATC, funded and equipped by IBRD and to administered by the Ministry of Education, will serve Yemen's current major agricultural production zone by producing mid-level agricultural technicians trained in agricultural technology.

b. Seed Multiplication

The objective of this high priority activity is to establish certified seed production testing and multiplication program. It will also support the development of a commercial seed industry.

c. Soil Fertility

The objective of this activity is to increase the efficiency of fertilizer use under both irrigated and rainfed conditions. Outputs will include a soil fertility laboratory, trained technicians, and recommendations for fertilizer use in Yemen.

d. On-Farm Water Management

The objective of this project is to develop within the Ministry of Agriculture a capacity to research, develop and extend improved on-farm water use technologies. Outputs will include a functioning soil-water laboratory Yemeni technicians capable of carrying out both lab and field research, training courses in irrigation practices and specific recommendations for more efficient water use.

e. Surdud Agricultural Training Center (Surdud ATC)

The IBRD will finance the construction and equipping of a second agricultural training institute at Wadi Surdud designed to serve the lowland Tihama plains region. It will be identical to the Ibb/ATC except for that the technical course content.

f. Higher Agricultural Education

Studies addressing the further development of the University of Sana including a Faculty of Agriculture are about to be undertaken by IBRD. It appears highly desirable to include the institutional development of the Faculty of Agriculture as an integral part of the Yemen Title XII program.

g. National Agricultural Research

The objective of this activity, which will be closely coordinated with the three educational activities presented above and the extension activity discussed below, is to provide vitally needed national level coordination by: (1) Cataloging, evaluating and coordinating all on-going research and identifying research needs; (2) directly undertaking the research required to meet the objectives of the Yemen Title XII Program.

h. National Agricultural Extension

At present, essentially the only agricultural extension activities in Yemen are being undertaken by and in direct support of donor assisted development projects. There is a need to develop a basic national field

services (outreach) system and to develop the capacity to train the low-level extension workers required for the implementation of the system. Due to the increasing importance of women in Yemen agriculture as a result of male labor migration, the activity will pay particular attention to meeting the needs of rural women in agriculture. The activity will also develop (as part of the system) an agricultural information program to ensure that agriculture research is responsive to the needs of the small farmer and that research results are utilized.

i. Dryland Resource Development

The objective of this activity is to develop and test prototype farming systems for the large areas of Yemen which are not suited for irrigated agriculture. The problems of forestation, land preservation/rehabilitation and desertification will be addressed.

j. Agricultural Credit

This activity will be primarily engaged in examining the credit needs of the rural sector and in establishment of local level credit institutions. This activity will be closely associated with (and may be combined with) the following activity:

k. Agricultural Cooperatives

The objective of this activity will be the development of an agricultural cooperative structure at the local level, tied to the greatest extent possible to existing local level institutions and aimed at mobilizing local resources.

In addition, Design Team members were expected to be alert for additional opportunities for assisting agricultural development in the Yemen Arab Republic. Thus, Design Team members were expected to take a sufficiently broad view of agriculture in Yemen to recognize new opportunities or to cast into a broader perspective opportunities identified in the Project Identification Document while simultaneously being sufficiently specialized to design projects in such areas as agricultural secondary education, soil fertility and on farm water management.

Resources available for the task of designing the Agricultural Development Support Program included approximately 17 person-months of professional

services. The diversity of required skills dictated the selection of 12 professionals for assignment in Yemen. Because of the complications of rearranging personal schedules on short notice and the logistics of housing, transporting and coordinating the efforts of 12 persons in Yemen, it was impossible for the entire team to be in country at once. Thus, it was necessary to choose procedures which allowed the team to complete its task in the absence of face-to-face contact for all team members.

USAID budgeting dictated that the design effort for the Ibb Agricultural Training Center be completed in time to secure 1979 Fiscal Year funds. Harold Matteson, the Project Director chosen by New Mexico State and CID, took full responsibility for the design of the Ibb Agricultural Training Center. The Ibb/ATC Project Paper is included as an attachment to the Design Team Report. For details of the Ibb/ATC design effort, see Matteson's memo which is also attached to the Design Team Report.

Seven of the Design Team members gathered in Tucson on April 30 and May 1 for a pre-departure orientation session, where they were given information on agricultural, economic, social and cultural conditions in the Yemen Arab Republic and on AID policies. A copy of the Summary Record of the orientation session is attached to this report.

During the three week interval between the Orientation Meeting and the departure of the first wave of Design Team members for Yemen, the team leader prepared a suggested outline for individual team member reports and conferred individually with seven team members about individual responsibilities. (Two team members, Kenneth Duft and William Farnsworth, had not been identified at the time the team leader departed for Yemen.) A copy of the Suggested Outline for reporting findings developed by the Team Leader is attached to this report.

Upon arrival in Yemen, each team member acquainted himself with written information on Yemen, talked with and/or read the reports of team members who had arrived earlier, met with YARC and USAID personnel acquainted with his areas of responsibility and visited areas and projects of special interest outside Sana.

Most team members had the opportunity, early on, of making an initial oral presentation to interested observers. Feedback from these seminars was

incorporated in material for a second oral presentation and written reports. Others are attached to the Design Team Report under the heading Individual Reports of Design Team members. Before leaving Yemen, each Design Team member shared her/his conclusions and observations with the USAID Mission Director or Acting Director.

In addition to making contributions in their areas of individual expertise, several team members made contributions to the preparation of the Core Project Paper and the Agricultural Water Resources Project Identification Document. For example, several Design Team members contributed to the assessment of needs of MOA personnel for training, an assessment required to justify the training portion of the Core Project Paper. Each Design Team member in Yemen during the last three weeks of July contributed to the Agricultural Water Resources Project Identification Document by attending the numerous working sessions in which Agricultural Water Resources activities were proposed, revised, written in draft form and rewritten.

Responsibility for drafting the Core Project Paper during the second and third weeks of August fell to Robert Phillip Upchurch and Donald Heckerman with Russell Olson, AID/W, assisting. The authors drew heavily on materials contained in the Social Soundness Analysis, the Baseline Field Studies Report and the Agricultural Water Resources Project Identification Document as well as many formal and informal discussions with YARC and USAID officials and with Design Team members. A partial list of meetings with YARC officials, representatives of other donors and USAID personnel is attached to this report.

Draft copies of the Core Project Paper were delivered to members of the USAID Project 0052 Committee on August 20. As a result of numerous conferences with USAID officials, a revised Core Project Paper and Budget were prepared. These documents, together with the Baseline Field Study Report and the Agricultural Water Resources Project Identification Document, were transmitted to the USAID Program Office on August 30. A copy of the letter of transmittal is attached to this report.

On September 5-6, nine members of the Design Team met in Tucson to report to the CID Yemen Advisory Committee and to make final revisions in the Design Team Reports. A Summary Record of that meeting is attached.

Editing and proofreading of Design Team Reports was delegated to Clyde Adams and Don Heckerman. That task was completed in mid October.

Attachments:

Suggested Outline for Reporting Findings

Collaboration with YARG, Other Donors, USAID

Letter of Transmittal to Huesmann



THE UNIVERSITY OF ARIZONA

TUCSON, ARIZONA 85721

COLLEGE OF AGRICULTURE
DEPARTMENT OF PLANT SCIENCES

May 8, 1979

TO: DESIGN TEAM MEMBERS
 Dr. G. Foerster
 Dr. G. Harris Ms. R. Saad
 Dr. J. Kearns Dr. R. P. Upchurch

FROM: Don Heckerman *D. Heckerman*

SUBJECT: Suggested Outline for Reporting Findings

Let me suggest that your written report should include the following:

- I. Description of existing conditions in your area of responsibility (e.g., current soil fertility practices by crop, tons of chemical fertilizers consumed in the country). Be as specific as possible. Quantify when secondary data sources exist.
- II. Identification of problems to be solved.
- III. Brief description of other existing and proposed assistance efforts.
- IV. List long term goals in your area of responsibility.
- V. For each goal, develop the following information:
 - A. Identify projects which help accomplish the goals
 - B. State project purposes
 - C. Identify project inputs and outputs
 - D. Propose a detailed time schedule for each project
 - E. Identify environmental impacts of each project

Enclosed are selected pages from the design team report for the Egyptian Rice Research and Training Project. These pages provide examples of the appropriate reporting form. I urge you to prepare appropriate "logical framework" and "critical performance indicator" statements and supplement with one or two paragraph elaborations of each entry in the logical framework statement.

You may find it difficult to go beyond identifying specific projects. I encourage you to approach (or perhaps even go beyond) the limits of your ability to prepare detailed input and output statements and time schedules. While your proposals may not be included in the formal paper which is to be submitted to AID in late August, they will be passed along as informal working papers to the "core team" which will follow us. The core team will certainly recognize the weaknesses of our hastily designed projects (and perhaps even snicker about their inadequacies), but in the end they are more likely to embrace and improve upon our proposals if they are detailed.

DGH:ew
Encls.

A Partial List of Meetings with YARG Officials
(See Individuals Reports for Other Meetings)

	YARG Officials	CID & USAID Personnel
May 30	Mohamed Jagman, Deputy Minister of Agriculture Mukbil A. Mukbil, Director General of Planning Kamil Mansour, IBRD Advisor to MDA Mahmoud Sayyed, IERD Advisor to Planning Directorate	Upchurch Saad, Thomas Heckerman Heckerman Young
June 5	M. Sayyed	Upchurch Heckerman Olson
June 6	M. Jogman, K. Mansour	Upchurch Heckerman Young Olson
June 7	K. Mansour	Heckerman Olson
June 10	Mohamed Al Waggeh, Ministry of Education Dr. Taham Elias, UNESCO Advisor to MOE Dr. Mohammed Al Harazi, Director, Agricultural Education Sayed Easha, UNESCO Advisor to Director of Agricultural Education	Huesmann Young Saad Thomas Heckerman
June 17	Abdullah Al Ansi, Director of Extension	Farnsworth Heckerman Shuga
June 20	Ishmail Mutawakil, Director General of Agric- ultural Services	Saad Nobe Heckerman
June 30	M. Mukbil	Saad Nobe Heckerman
July 5	A. Homsî, IBRD Advisor to Statistics Dept.	Nobe Heckerman
July 7	Ali Al Bahar, Deputy Minister, CPO	Nobe Heckerman Fort Warin
July 16	Hussein Al Fakih, Director General of Irrigation	Foerster Heckerman

July 18	Mukbil, Luft al Anai, Fakil, Telha, Ak, Al Ansi, Mobasher, Shuga, Fuad, Orabi Sharafadin	Upchurch Heckerman Fort Uphaus
July 21	A. K. Al Ansi	Harris Duft Heckerman
July 21	Dr. Juneide, FAO Advisor to Forestry Dept.	
July 22	Abdulla Zabarah, Director General of Livestock Dr. Mustafa El Mbasher, IBRD Advisor to Livestock Directorate	Harris Heckerman
July 22	Yahya Telha, Director of Crops Dept.	Heckerman
July 25	Mrs. Mustafa, Horticulture Dept.	Heckerman
Aug 2	M. Sayyed	Heckerman
Aug 7	Ahmad Ali Homed, Director General of TDA	Heckerman
Aug 8	Jancal Fuad, Director of CARTC	Heckerman
Aug 9	Luft Al Ansi, Director of Statistics	Heckerman
Aug 11	Sayyed, Mansour	Upchurch, Heckerman
Aug 15	Jagman, Mukbil, Mansour, Sayyed	Heckerman, Upchurch Olson
Aug 21	H. E. Macmood, Minister of Agriculture	Upchurch Neville Fort
Aug 21	Jagman, Mukbil, Mansour	Upchurch

A Partial List of Meetings with USAID/Yemen Officials
(See Individual Reports for Other Meetings)

<u>Date</u>	<u>USAID/Yemen Personnel</u>	<u>CID Personnel</u>
May 26	John Young	Upchurch, Saad, Thomas, Heckerman
May 26	Robert Huesmann, Harry Johnson, Young	Upchurch Heckerman
May 29	Johnson	Upchurch, Thomas, Saad, Heckerman
May 30	Johnson	Upchurch Heckerman
June 2	Huesmann, Russell Olson	Upchurch Heckerman
June 3	Herbert Blank	Heckerman
June 4	Johnson, Olson, Ross Kosheleff	Upchurch, Thomas Heckerman
June 5	Diane Ponasik	Heckerman
June 6	Huesmann, Olson	Upchurch Heckerman
June 12	Dan Cox	Heckerman
June 15	Tóm Mage	Heckerman
June 17	Huesmann, Johnson, Olson Mary Neville	Thomas, Saad, Farnsworth Heckerman
June 17	Pavich	Farnsworth Heckerman
June 23	Huesmann, Olson	Nobe, Heckerman
June 26	Ray Fort	Heckerman
June 27	Fort, Olson	Heckerman
July 7	Fort	Heckerman
July 18	Fort	Heckerman Upchurch
July 21	Charles Uphaus	Duft, Heckerman
July 21	Pavich	Duft, Heckerman

<u>Date</u>	<u>USAID/Yemen Personnel</u>	<u>CID Personnel</u>
August 9	Johnson	Heckerman
August 11	Johnson, Olson, Arthur Brittain	Upchurch Heckerman
August 18	Mission 052 Committee	Upchurch Heckerman
August 21	Mission 052 Committee	Upchurch Heckerman
August 22	Mission 052 Committee	Upchurch
August 29	Neville, Fort	Heckerman
August 30	Johnson	Heckerman

Contacts With Other Donors
(See Individual Reports for Other Meetings)

In addition to numerous contacts with International Bank for Reconstruction and Development personnel which are enumerated in the list of meetings with MOA officials, Design Team personnel participated in meetings with representatives of other donors in the Yemen Arab Republic. A partial list of those contacts include:

<u>Date</u>	<u>Donor Representative</u>	<u>CID and AID Personnel Present</u>
May 30	Dr. Mohammed Jama, Director, UNDP Agricultural Program in Yemen	Upchurch, Thomas, Saad, Heckerman
June 10	Harry Go and Valentine Desa, IBRD Education Project	
June 11	Erik Halberg, Hendrickson, Associerty, Consultants (Managers of Livestock Credit and Processing Project)	Heckerman
June 20	Go, Desa and Cromier, IBRD Education Project	Nobe, Young, Olson, Heckerman
July 10	Alfons Radikowski, German Federal Republic Advisory Team to the Central Planning Organization	Heckerman
July 14	Dr. Magdi El-Menshaui, German Federal Republic Advisory Team to the Central Planning Office	Harris, Heckerman
July 14	Halberg and Dr. Metzen, LCPP	Harris, Upchurch, Fort, Heckerman
August 2	F Mullin, IBRD Coordinator for Agricultural Programs	Upchurch

MEMO

TO: Consortium for International Development
FROM: Don Heckerman
TOPIC: Assumptions Underlying the On-Farm Water Management
Activity and Suggestions for Monitoring the Activity

The On-Farm Water Management activity is the largest proposed activity for which Yemeni farmers would be direct beneficiaries. (Others such as the institution-building and training activities will indirectly benefit agricultural producers.) Consideration of this activity required Design Team members to identify the problems which Yemeni farmers will face over the next twenty years. The purpose of this note is to identify the economic assumptions underlying the design of On-Farm Water Management activity.

Design of the activity assumes that emigration of Yemeni laborers will continue, resulting in rising real wages and foreign exchange earnings sufficient to pay for sizable food imports. Under these circumstances farmers will have to innovate in order to cope with the twin challenges of high labor costs and cheap imported food. Yemeni agriculture will be forced to turn to mechanization, larger farming units and/or "new" high value crops if it is to remain viable. The second phase of the On-Farm Water Management activity is designed to provide the farmer with technical assistance which will ease this transition. By concentrating on technical assistance and omitting assistance in credit and in changing land tenure patterns the design reflects the assumption that land tenure patterns and credit availability will respond sufficiently to economic incentives and that they will not represent insurmountable barriers to agricultural innovation. Design of the activity also assumes that there exist growing opportunities for export of fruits and vegetables to Saudi Arabia. The Design Team has assumed that Saudi income will continue to grow and that the Saudis will permit substantial imports of fresh fruits and vegetables.

If any of these assumptions prove to be incorrect, the second phase of the On-Farm Water Management activity is likely to prove less effective than currently envisaged. The Core Team should establish an early warning

system that will allow identification of circumstances that might lead to failure of the On-Farm Water Management activity as currently designed.

Data on labor emigration and remittances as well as trends in Saudi policy toward Yemeni immigrants can be directly monitored. It is also possible to monitor directly Saudi policies toward imports of fresh fruits and vegetables. In other cases such as credit adequacy and flexibility of land tenure patterns direct monitoring may provide little or no information. "Adequacy of credit" is a notoriously ambiguous concept; no amount of study of credit is likely to provide one with sufficient information to predict whether adequate financing is available to permit particular agricultural innovations. Neither would one expect to learn from a study of existing land tenure institutions how land management practices will respond to increased profitability in agriculture. Thus, other indicators are needed to be able to identify the effects of credit shortages and inflexible land tenure systems.

Perhaps the best that can be done is to monitor directly the progress of the On-Farm Water Management Activity. By measuring progress against carefully specified goals, it will be possible to detect quickly emerging difficulties. Any shortfall should provoke a critical analysis and permit timely revision of the activity in the light of changed circumstances.

Core Team monitoring of export market conditions could help to prevent conditions which might damage export market opportunities. One possible threat to Yemeni export of fruits and vegetables would be misguided Saudi efforts to protect their own fledgling agricultural sector. Timely Core Team efforts to assist the Yemeni in helping Saudi Arabia to identify its own best interests could be instrumental. Americans from the Western United States are in a particularly good position to point out the advantages of creating in neighboring countries a viable agricultural sector which provides cheap food imports, employment opportunities at home which reduce incentives for migration, and contributes to political stability. In case balance-of-payments deficits appear, the Core Team should be prepared to counsel the YARG to avoid adjustment policies which discourage exports. The 1950's and 60's have made it clear how easy it is to drift into a balance-of-

payments policy which discriminates against domestic agricultural producers. All too often countries faced with internal inflation and balance-of-payments deficits choose to fight the deficit by restrictions on non-food imports rather than devaluation. The high domestic inflation rate raises the costs of domestic agricultural producers and makes it difficult for them to compete in either foreign markets or in domestic markets where imported food prices are artificially low because the local currency is overvalued. Dealing with the deficit by devaluing the local currency will stimulate domestic agricultural production by allowing producers to earn higher revenues in both foreign and domestic markets. Leaders who see only the opportunity to keep food prices artificially low in the short run must be given the opportunity to understand that such a policy will surely reduce domestic agricultural production.

TO: Consortium for International Development
FROM: Don Heckerman
TOPIC: Individual Report

During the period May 26 - August 31 I was stationed in Sana, Yemen Arab Republic where my task was to serve as team leader with the Design Team for a Program of Agricultural Development. During that period, and for a few weeks preceding and following my trip to Yemen, my responsibilities were to:

1. Assist Design Team members in defining their responsibilities and in identifying their inputs into the project papers and the project identification documents to be submitted to USAID/Yemen in fulfillment of CID's contractual obligations.
2. Orient Design Team members upon arrival in Yemen and assist them in beginning their research efforts.
3. Plan for and coordinate Design Team efforts to collaborate with YARG and USAID/Yemen in designing a Program for Agricultural Development Support in the Yemen Arab Republic and, together with the Program Director, carry on many of the conversations required by that collaborative effort.
4. Take responsibility for preparation of project papers and project identification documents to be submitted to USAID/Yemen and to accept a major role in writing those documents.
5. To arrange for logistic support in Yemen for the Design Team, including supplies, transportation, typing, recordkeeping, and disbursement of funds.
6. Assist with editing Design Team reports.

The Design Team Report on the Agricultural Development Support Program represents the culmination of efforts for which I, as team leader, accepted final responsibility. A record of our efforts to collaborate with YARG and USAID/Yemen officials in designing the program is included in the Report on Design Team Procedures. These results were possible only because of the cooperative efforts of each member of the Design Team. Without exception,

each member of the Design Team fulfilled the delegated responsibilities and made significant contributions to the proposed Agricultural Development Support Program submitted to USAID/Yemen. Because of the efforts of each team member, it was possible to meet CID's contractual obligations to USAID on schedule.

SECTION F

INDIVIDUAL TEAM MEMBER REPORT

TRIP REPORT, RECOMMENDATIONS

and

EXTENSION PROJECT IDEAS

of

WILLIAM F. FARNSWORTH

MEMBER

TITLE XII DESIGN TEAM, EXTENSION SPECIALIST

Arrival date in Yemen, June 12, 1979

Departure date from Yemen, July 9, 1979

APPRECIATION - Many people deserve thanks for making my participation possible. My co-workers at USU in Logan, Utah and my family members have all assumed extra duties during my absence. The USAID/Sana staff has been most cooperative and helpful. My co-workers on the Design Team have been patient and helpful; Dr. Don Heckerman, Design Team Leader; Fatiba Saad, Soils Specialist; Dr. James Thomas, Seed Multiplication Specialist; Dr. Ken Nobe, Agricultural Economist and traveling companion throughout Yemen; and Dr. Jean Kearns, Sociologist for the Team. Finally, I am thrilled with the opportunities that were mine to meet and associate with Yemeni farmers, coop leaders, researchers, extension workers and leaders and staff working in development projects including Yemeni nationals and expatriate personnel. I found the Yemeni nationals to be young, enthusiastic, cooperative, and desirous of learning new skills and knowledge to enable them to do their work more effectively. I feel the most important thing we can do to develop Yemeni agricultural institutions is to help develop the people educationally, and to provide financial and educational resources in the process. With proper educational development, the Yemeni will develop their resources. They impress me that they are on the move to join the modern world. I am optimistic for their future because of their resourcefulness, initiative and independent courage to move ahead and do new things.

The purposes of my TDY assignment in Yemen are to: (a) study the Ministry of Agriculture National Extension Service; (b) identify projects that might be implemented through a Title XII contract; and (c) provide preliminary project design information to be used by the Title XII Core Team (in cooperation with USAID/Sana and the Ministry of Agriculture staff) in actually developing projects or programs that will strengthen the National Agricultural Extension Service.

In fulfilling this assignment, the writer did the following things:

1. He read extensively from pertinent literature provided by the Team Leader and staff.
2. He toured extensively in Yemen for 10 days, visiting with directors of donor projects impacting on agriculture extension operations and development and with Ministry of Agriculture personnel stationed in field locations.

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3. He participated in three seminars with team members, USAID staff etc. to review tour findings and to explore alternate project actions and ideas.
4. He wrote and submitted information to the Team Leader to support the extension elements of the BIFAD Baseline Studies Field Manual.
5. He submitted a brief outline of three potential projects or programs for Title XII USAID consideration.
6. He assisted with the orientation of newly arrived Title XII team members.
7. He assisted Mr. Basha of the WMP/Ministry of Education staff in developing a draft proposal for the Ibb school curriculum on training in rural development/agricultural extension philosophy, principles and practices; and
8. He left three draft project or program design ideas, the implementation of which could strengthen the functions and staff performance of the National Agricultural Extension Service.
9. Recommendations for strengthening the development of a National Agricultural Extension Service in the YAR:
 - A. Devise ways and means to raise salary of extension workers so that all positions are competitive with the private sector employment opportunities for given levels of training and experience.
 - B. Enroll as many of the current local level extension worker staff as possible in the Ibb/Surdud schools so they will have at least a high school level of education.
 - C. Outstanding graduates from Ibb and Surdud schools to be identified and moved on for B.S. level training out of Yemen at the earliest opportunity.
 - D. Devise financial assistance as appropriate for Ibb/Surdud trainees and for B.S. degree candidates with a commitment that they will return and work in the extension or research elements of the Ministry of Agriculture.
 - E. Unify agricultural "outreach" programs of the Ministry of Agriculture. The 30 livestock technicians should be in the extension program.

F. Develop direct communication between extension activities of development projects (SURDP, TDA, etc.) and the national director of the Extension Service. Three more development projects will be developed by 1980 (Khawlan, Al-Jawf and Hajjah). The goal should be to evolve, in time, a coordinated agricultural extension service with sufficient communication up through channels to enable the national director to be an effective voice for extension planning and budget development at the national level.

G. Effective local extension operations require close relationships and communication with research developments. Therefore, all research staff should have as part of their job description a role to serve as subject matter specialists in Extension. That role to include: (1) help plan, implement and evaluate extension programs with local extension workers; (2) help train agents in subject matter of his particular research speciality. This should be a permanent part of each researcher's role.

H. Develop an AGRICULTURE RESEARCH EXTENSION LEARNING RESOURCES CENTER with field sub-stations in each development project area (SURDP/TDA, etc.) with capability to distribute resources to sub-stations on a weekly or bi-weekly basis as needed. (See project paper idea with expanded explanation).

I. Develop a personnel management capability within the National Extension Service (needed throughout the entire Ministry of Agriculture) that guides:

- (1) recruitment and placement of staff;
- (2) an incentive system that identifies, rewards and communicates excellence in staff work;
- (3) horizontal and vertical advancement policies and procedures;
- (4) the development of a personnel records system containing individual files;
- (5) the development of job descriptions and their use in personnel evaluation, etc.

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J. Develop a training curriculum for the Ibb and Surdud agricultural vocational schools practical in terms of preparing graduates for (1) immediate entrance into work in extension and (2) entrance into B.S. university training.

K. Develop in-country inservice training for the extension supervisory staff. This training to include subjects relating to personnel management, program development, budget development, staff motivation and evaluation as well as agricultural subject matter.

L. As new development authorities or projects are developed on a regional basis, integrate the research/extension functions so that close support for outreach functions evolves from research personnel. If and when an Agricultural college with research/extension capability is developed, keep extension/research integrated in performance roles, philosophy and budget considerations.

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EXTENSION PROJECT IDEA NO. 1

TITLE: Learning Resources System for Research, Extension and Schools at Ibb and Surdud Situation

I. Situation

Agricultural research and extension in YAR are infant organizations. The Ibb school is under construction, and the Surdud school is only in planning. The level of training of extension field workers is between grades 6 and 9 plus additional training, or about a year at Taiz (CARTC) or Zabid(TDA) and some inservice training. Only the director of the National Extension Service (NES) has a M.S. degree in agriculture and extension.

Nearly all agricultural extension work in Yemen is being conducted through and within the confines of development projects (TDA, SURDP, the German Plant Protection Project, etc.). Three additional development projects are to be made operational by 1980 at Kwawlan, Al-Jawf and Hajjah. These projects have Yemeni leadership with expatriate counterparts. They direct and coordinate both research and extension activities. Without exception, research and extension staff lack adequate access to written subject materials to support them in their work. Extension field workers lack teaching resources. The library and teaching resource base for the new Ibb school is still largely unknown, but it expected to be deficient in such resources for some time.

There are about 884,000 rural farm families in Yemen. The women and children do much of the farm field work. Cultural mores are not conducive to having men extension agents visit with or teach women farm workers. Television and radio equipment, powered by community or home generators or even by car batteries, provide opportunities for reaching all segments of the rural population with information programs to improve the quality of rural living. This includes the opportunity to provide literacy programs, badly needed by both men and women. At present there are no resources or human abilities (trained and prepared to work) to use radio, TV, newspapers, printed information fact sheets or library services to accomplish the goals established for research, extension or the Ibb school.

UNIVERSITY OF YEMEN LIBRARY

II. Project Idea

The project idea or proposal is to develop within the Ministry of agriculture (MOA) a National Research/Extension/Vocational agricultural school LEARNING RESOURCES CENTER in Sana with sub-stations located at the Ibb and Surdud schools and in each development project organization to service the needs of research, extension and school teaching staff.

A. The proposed learning resources center would consist of two major elements: (a) an agricultural reference library; and (b) an agricultural information center. Each would consist of trained personnel and modern equipment to accomplish their defined roles. The role of the library would be to acquire, maintain and disseminate printed technical materials essential for researchers and fact sheets and visual aid teaching resources important to the extension function. The radio, TV, audio visual and printing resources role would be to prepare and disseminate educational materials to broadcast systems and to sub-station locations as described earlier. The figure on page 9 sketches the possible organizational structure and linkages to appropriate national government ministries for authorization and coordination.

B. The Learning Resources System is intended to provide the following:

1. A national center (library) to serve as a depository of technical agricultural printed matter essential for research, extension and vocational school operations staff

2. A system for disseminating technical agricultural information from the central depository to users of the resources located at stations within the confines of development authorities and the Ibb/Surdud schools: a shuttle bus or bookmobile distribution system contacting research/extension/school centers on a weekly, bi-weekly or monthly basis as demand required

3. Public agricultural education programs via TV, radio and printed materials that are timely and on the proper educational level for program recipients (men, women and children)

4. A supply of audio visual equipment and program materials for use by extension, research and school staff to enhance their work.

Three major elements make up the project: (a) training resource

people to operate the project; (b) acquiring commodities to enable the trained staff to perform, and (c) financial operational support.

C. Project elements:

This should be a cost share project with the YAR. The YAR should provide appropriate space facilities within the MOA, development projects and at the vocational agricultural schools to house all elements of the learning resources center. I envision the library facility disseminating not only literature (books, journals, technical magazines, etc.) but also the audio visual program resources and equipment and extension printed materials for use with clients.

The USAID/Title XII Program (perhaps in cooperation with the UNDP/IDA/World Bank) etc. should provide the equipment to be used in the project and should provide the personnel training needed to make the system work. This would include sending librarians, radio, TV and print press operators, graphic artists, etc. to appropriate locations for training. Also included would be financing subscriptions for scientific journals to be used by research staff etc.

D. Project Objective

The objective would be to institutionalize a learning resources system to serve the needs of agricultural research, extension and vocational school staff in a manner to contribute to their performance in serving the agriculturally concerned public of Yemen.

E. Project Alternatives

Given the current condition of research, extension and vocational agricultural training in Yemen, I see this project filling a void that is now constraining progress in YAR agricultural development. Many other activities are in progress to help develop the agricultural and rural sector. This project idea is not being dealt with by other donors, but would enhance their project efforts as well. It is also a positive response to frequent requests to USAID from SURDP leaders for help to strengthen their library resources which are so essential to their work.

The main alternative to this project appears to be working on the library aspect alone, or on the audio visual portion separately.

However, they are compatible. complimentary elements of what should constitute one system. All elements are necessary for an effective coordinated research/extension/teaching system to promote agricultural development in Yemen.

III. Policy Issues

I feel YAR/MOA can absorb this project if financial support is available because such a system is needed. None exists at present.

Further study is needed to determine the quantity of trained personnel already available in YAR to make the program operational. Arabic speaking expatriates would need to added to the system, perhaps through UNDP/FAO/World Bank etc. to provide counterpart supervision to Yemeni staff as they start the program.

I see no detrimental environmental problems developing from this project.

The administrative personnel for this project will need training. That can be handled through the Title XII contract.

IV. Project Preparation Strategy

1. The core team leadership needs to explore the details of this project with appropriate MOA/MOE/MOI staff. Research and extension and Ibb school leaders have already expressed the desire and need for such help during my tour visits.

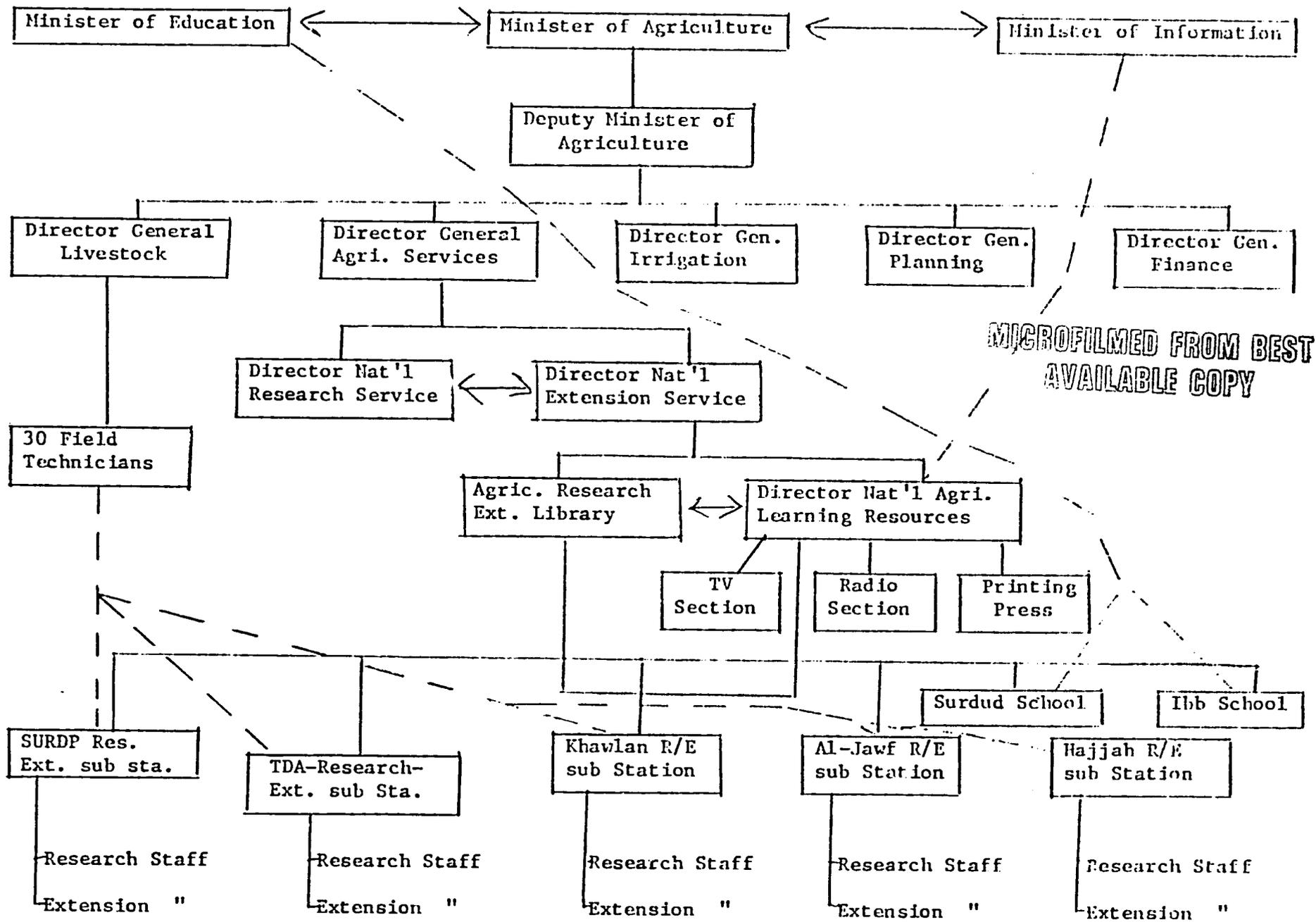
2. TDY staff knowledgeable about library science and audio visual/print shop operations need to meet in Yemen with appropriate Yemeni officials to design the project and gain acceptance.

3. Other project donors need to be consulted and involved in the planning so that duplication will be avoided and opportunities for maximum cooperation identified. Other donors may be interested in helping to fund the equipment purchases.

4. I see no need for an environmental impact study on this project as there will be no construction to alter existing environmental conditions.

5. Economic costs will need to be studied and determined by TDY personnel well versed in library/audio visual equipment, acquisition and set-up costs, maintenance, etc. Part of this cost may provide for training service personnel to keep all electronic and duplicator equipment operational.

Figure 1. Organizational Structure for Agriculture Research/Extension/Vocational School Learning Resources System



EXTENSION PROJECT IDEA NUMBER 2

TITLE: Public Administration or Personnel Management System for the National Extension Service (NES)

I. Situation

The director of NES in Yemen is the first such position occupant in modern YAR history. The entire agricultural extension function is not more than 4-5 years old. To date, there is no personnel management policy or system within NES. There is no central personnel office with individual files on staff. There is no recruitment, employment or general personnel management policy or procedures relating to promotion, vertical or horizontal advancement, staff evaluation, staff development, etc. In brief, the whole area of personnel management is a void in the National Extension Service. The YAR First Five Year Plan (1976-81) specifically calls for the development of an effective national agricultural extension service that can extend the findings of research to farmers that result in increased agricultural production and improved quality of rural living.

II. Project Description

This project has two elements. (1) Developing within the MOA/NES a desire for and awareness of the need for a personnel division and staff policy that results in high staff performance and morale. (2) Training of key MOA/NES staff in personnel office management systems and to help the trained staff develop an efficient, effective personnel division. (Note: I feel this project should be ministry wide in scope, not just for Extension, and leave this suggestion for others of the Design Team to think about, define and implement if acceptable and of merit). The NES and the MOA needs a systematic, orderly records management operation and such should constitute a base from which to launch effective staff performance throughout the entire ministry.

These kinds of records identify, or make it possible to identify management problems such as turn-over rate, worker performance, promotion procedures and needs, salary adjustment policies and procedures, inservice and post B.S. degree level training programs, etc.

The problems being addressed through this project are:

1. Filling the void of no trained personnel staff, the void of no personnel records on employment and performance, etc.
2. Placing the management of personnel on an objective basis with a goal of high staff morale and quality staff performance to achieve extensions objectives.
3. Staff training and development will be on a purposeful, informed basis to satisfy staff needs in the broad MOA organizational structure.
4. The beneficiaries of this project would be (a) the Ministry of Agriculture and its various divisions; (b) the people working in the MOA; and (c) the people served by the MOA staff. Improved research teaching and extension staff performance will in turn enhance the rate of discovery and transfer of new information to farmers, processors and consumers. Other factors also bear on achieving such organizational and societal goals, but personnel office performance, and policies are essential elements to include if the stated MOA/NES objectives are to be achieved.

I see no serious policy issues if YARG/MOA officials are involved at all stages of the project. Costs associated with training and implementation of a personnel program should be shared by MOA and USAID/Title XII project. The project could provide the training costs; the MOA the salary costs of participating staff. If out-of-country training results, Title XII/USAID should participate.

III. Project Preparation Strategy

1. The Title XII core team with TDY assistance should meet with the director of the YAR NES and other interested MOA personnel to explore the need and implementation and planning of this project.

2. If a strong need is expressed, MOA/Title XII personnel should jointly design a personnel administration training program for MOA staff. Other donors should participate in the planning (such as World Bank, UNDP, etc.). Appropriate study and evaluation of current personnel management policies and procedures should provide sufficient

information on which to design a meaningful, practical program.

Arabic speaking instructors should be brought to Yemen/Sana to conduct the training.

Ways and means to be provided jointly by MOA/YAR and Title XII/ USAID to cover costs. The host country should provide the participants to be trained, space for them to work following the training, and support the acquisition of necessary equipment to make the program operational with the MOA.

The Title XII core team will bring in TDY staff to design the project. The MOA will make its staff available for the training and provide them with the necessary equipment and supplies following the training to enable them to use and apply the new knowledge and skills gained from the training. Social conditions will need study to enable proper program application to women employees as well as to men.

People and Places I Visited While in Yemen

--Bill Farnsworth 7/8/79

1. The German Plant Protection Program, Sana
2. The German Rural Development Program, Amran
3. USAID Poultry Projects--Sana and Taiz
4. Dutch Broiler Project, William Vetterling--Sana (El Rahdah)
5. John Young, USAID Agriculture Officer, Sana
6. Dr. Ray Fort, USAID Agriculture Officer, Sana
7. Russell Olson, AID/Washington, D.C.
8. Dave Robinson, U. of Arizona Sorghum Project
9. Frank Pavich, USAID/Sana, Rural Development Officer
10. Tom Meyer, USAID Poultry Project Leader
11. Museied Atteo, Asst. Manager, Sorghum Project
12. Robert Hussman, Director, USAID/Sana
13. Abdulah Kasim Al Ansi, Director, National Extension Service, MOA
14. Mutawabeil, Director General, Agriculture Services, MOA
15. Wallace Swanson, American Save the Children Project, Amran
16. Morgan Stickney, Deputy Ag. Officer, USAID/ Sana
17. Ali Zoom, Director General, Ag. Services, YAR/MOA/Hodeidah
18. FAO Training Center, Hodeidah (Fishery Building)
19. Gumeisha Farm, Klm 16, Hodeidah-Bamatraf
20. Ali Mahomad, Extension Worker, Klm 16
21. Wadi Siham Area--Ahmed Qassim, Extension Supervisor
22. Ahmed Mahamed Sayed, Chief, Extension Operations, Hodeidah
23. Dr. Abdallah Caaya, FAO/UNDP Training Program, Hodeidah
24. Nasr El Deem M. Rohaiem, UNDP/TDA Extension Trainer
25. Garabeh Demonstration Farm and Extension Center
26. Kaban Abdulah, Extension Agent, Garabeh
27. Surdud State Farm (future Vocational Ag. School)
28. Gazy Nasr, Manager, Surdud State Farm
29. Lowia Area Cooperative, Director, Asst Director, and Board Members
30. UNDP Extension Office, Hodeidah
31. Wadi Surdud, Dahi Community
32. Mahmad Fadail, Extension Agent, Dahi
33. Zabid TDA Training Center, Extension Section

34. Jerba (Wadi Zabid) TDA Hdqtrs, Exp. Farm
35. Ahmed Ali Homed. Director, TDA
36. Abdul Moamen Haza'a, Asst. Director, TDA
37. British/Yemen Agric. Engineer Project, Taiz
38. British/Yemen Agric. Engineer Project, Roy Lowthian, Controller
39. British/Yemen Agric. Engineer Project, Jerry Dean, Technician
40. British/Yemen Agric. Engineer Project, Allan Watson, Technician
41. Southern Upland Rural Development Project (SURDP) Taiz
42. Ali Mukrid, Director Ag. Office, Taiz
43. SURDP Training Center, Taiz
44. Zain, Rural Development Board
45. Mr. Tuari, UNDP Ext. Supervisor, Taiz
46. Anthony Cha Cha Omari (Kenya) Ext. Supervisor, Taiz
47. Dr. Bacha', UNDP Expatriate, Ministry of Education
48. Faud Diab, Importer, Agric. Products, Sana

Yemeni Extension Linkages with Local Development Associations (LDA's)

Local development associations (LDA's) are effective organizations in Yemen. Their major concerns relate to improving roads, culinary water supplies for communities, schools and community health clinics. These organizations are financed in part through an agriculture tax. Their organization extends vertically from local areas to governorates (provinces) and to a national level.

The principal site of action in LDA management is currently at the local level. Province and national segments of the movement do not as yet appear to have major impacts or action programs.

I pondered the possibility of having LDA's share salary costs of their local extension workers as farm organizations did in the early years of extension in the U.S.A. I discussed this matter with local farmers, extension workers, USAID officials. Two key problems emerged that caused me to drop the idea.

(1) The attitude of public officials and private citizens is not in favor of such a cooperative venture. LDA officials are looking for more support for their projects, not to cost share in someone's salary, or operating expense. For example, one LDA had agreed to pay the rent on an extension local office. When the bill came before the governor, he dis-allowed the expenditure as it was supposed to be paid by the Ministry of Agriculture.

(2) No leadership at either local, province or national level was identified as giving encouragement to closer cooperation between extension and LDA projects.

Considering that most extension agents are teenagers and very inexperienced, I feel it is pre-mature to expect close program development cooperation in Yemen between LDA's and the extension service. However, the LDA's seem to constitute much of the power structure in community activities. The LDA leadership needs to be involved in setting priorities and helping implement extension programs if success is to be achieved. When local extension workers are more skilled and competent in their work, I think LDA's will be more cooperative and supportive of extension work.

Question: WHAT CONSTITUTES AN EFFECTIVE AGRICULTURAL EXTENSION SERVICE?

ANSWER: To be successful, an extension service should have:

1. Staff competent in technical subject matter
2. Staff competent in skills to identify and involve local leadership in the program development processes
3. A close linkage between agricultural research personnel and programs and extension personnel and programs
4. A competent staff of subject matter specialists to link research with field extension programs
5. Competent administrative and supervisory staff
6. A clear line of authority from field workers up to the top administrative officer
7. Clearly stated roles and relationships of all organizational positions effectively communicated throughout the entire organization
8. Clearly stated organizational objectives that employees and clients know and understand and can relate to
9. Adequate financial resources for salaries, operating supplies, equipment, transportation, etc.
10. A system for evaluating staff performance and program effectiveness, and for rewarding staff excellence
11. A system for accounting to supporting publics and clients
12. A bit of good luck - being in the right place at the right time to perform the right kind of program in an effective manner

REMEMBER: Extension is an educational function, concerned with changing human behavior in terms of knowledge about and of things, attitudes towards things, and skills to do things. Overall, extension must be able to promptly respond to client priority needs with programs that enable clients to make informed decisions and thereby more successfully cope with life's challenges and problems.

SECTION G
INDIVIDUAL TEAM MEMBER REPORT
OBSERVATIONS, RECOMMENDATIONS,
AND
OUTPUTS AND CONCLUSIONS
OF
K. C. NOBE
MEMBER
TITLE XII DESIGN TEAM AGRICULTURAL ECONOMIST

June 17-July 15, 1979

Sana, Yemen

1

July 20, 1979

MEMORANDUM

TO: D.G. Heckerman and R.P. Upchurch

FROM: K.C. Nobe

SUBJECT: Trip Report: CID Title XII Design Team Assignment, Yemen Arab Republic (YAR), June 17-July 15, 1979

Background

I accepted this assignment in late May at the request of Jim Wood (CID), after preliminary discussions with other Design Team members had already been held in a meeting at Tucson, Arizona. It was my understanding in accepting this assignment at this late date that I would be a representative of CID, rather than Colorado State University per se, and would be expected to reflect my prior experience and expertise in helping to design an interdisciplinary, interuniversity overseas agricultural development program.

Specific TDY Responsibilities

My understanding of my assigned tasks on the Design Team included the following

- 1) Prepare first draft copy of selected portions of a REE Baseline Study report for the YAR, for the following sections of the BIFAD manual outline:

- 3.0 Overview of the Agricultural Sector
- 3.1 Rural Population Distribution (disaggregated by agricultural regions)
- 3.2 Resource Distribution--(Land, Water, Climate)
- 3.3 Production Inputs: Management, Technology (but not credit, which was delegated to Ken Duft)
- 3.4 Infrastructure, Distribution, Marketing, Processing
- 3.5 Public Policy and Planning: Development Goals
- 3.6 Production Valuation Distribution by Client Groups and Commodity Valuation (Note: Deleted later for lack of data; a new Section 3.6 was substituted: "Summary of Donor Agency Projects & Programs in the YAR")
- 3.7 Regional Distributions of Production and Value (4.0-4.1-4.2: assigned to other team members)
- 4.3 Constraints to Agricultural Production and Development Strategies

4.4 Identification of Alternative Development Strategies

- 2) Make selected inputs as feasible to drafts of the remaining sections of the REE Baseline Study Report, particularly to Section 5--"Recommendations for Strengthening the REE System."
- 3) Participate in group discussions (including Design Team, AID and MOA personnel) of broad-based program components to be included in the Project Paper for the proposed CID Title XII Project in the YAR.

Note: It was my distinct understanding that the REE Baseline Study Report had been specifically requested by AID and was to include an assessment of total REE strengthening needs while a second document, the Project Paper, would synthesize out of this first report (and from separate trip reports written by Design Team members) those program components that CID would propose to undertake as components of a long-term (say, 10 years) AID-funded agricultural development program in the YAR. I proceeded with my assignment on this basis and if there was a later decision by AID and/or CID to deviate from this approach it was not made clear to me at any time prior to my departure. Therefore, I proceeded to carry out my various assignments, as outlined above, with the assumption that they will be accepted by CID in that context.

Study Procedure

My study approach consisted of three major elements:

- 1) An extensive field trip through the major agricultural production areas of the YAR, traveling by road from Sana to Hodeidah, to Taiz, to Ibb and back to Sana. Several side trips were made to various points in the Tihama Desert Region (accompanied by an FAO Extension employee with Arabic speaking capability and extensive experience in the area), because of the potential this region of the YAR appears to offer for rapid expansion of agricultural output (if its limited water resources can be effectively managed at the farm level and if a cropping system of high value crops is adopted).
- 2) Extensive reading of available agricultural development reports, the current 5-year plan and related documents. Of particular value were

review draft copies of two World Bank Agricultural Sector Memoranda (June 1979). Permission to "borrow" from the draft documents had been obtained from Dr. Elco Greenshields, one of the principal authors with whom I visited in Washington, D.C. enroute to the YAR. (Dr. Greenshields has been on four separate Bank missions to the YAR during the last ten years and is generally viewed in the development community as a reliable source on YAR's agricultural growth potential)

3) Contacts ranged from formality visits to meetings of substance with a number of MOA, USAID, AID/Washington, CID personnel and local YAR farmers. These included the following:

- i. Director General, Agricultural Services, Ministry of Agriculture (MOA)
- ii. Director General, Agricultural Planning and Statistics, MOA
- iii. Regional Director, Agricultural Services, MOA, Hodeidah
- iv. Director General, Tihama Development Authority, Wadi Zabid
- v. Team Leader, T & K Construction Group, Wadi Zabid
- vi. Director, MOA Gmaisha Farm, Hodeidah
- vii. Director, MOA Surdud Farm, Wadi Surdud
- viii. A group of farmers who were members of a local okra producing cooperative, Lawiyah Village in the Tihama Desert
- xi. MOA Project Leader, USAID Poultry Project, Taiz
- xii. Director, UK Farm Mechanization Training Project, Taiz
- xiii. Construction Foreman, Ibb Extension School
- xiv. Deputy Minister, Central Planning Organization, YAR
- xv. Mission Director and Associate Mission Director, USAID, Yemen
- xvi. Agricultural Officer, USAID, Yemen
- xvii. Desk Officer, Near East Bureau, AID/Washington (on TDY to Yemen)
- xviii. BIFAD Representative (on TDY to Yemen)

- xix. CID's YAR Title XII Project Leader (on TDY to Yemen)
- xx. Various members of the CID Design Team

Outputs

- 1) Draft stage copy for Section 3 of the REE Baseline Study report (includes suggested CID team conclusions that may be deleted or modified at Team Leader's discretion and needs overall editing as well)--approximately 50 pages.
- 2) Draft stage copy for parts of Section 4, as assigned (same caveats as above apply)--approximately 15 pages.
- 3) My contribution to possible set of recommendations in Section 5 (again may be edited or deleted at Team Leader's discretion)--approximately 10 pages. (See also Attachment No. 1, Part 5.0).
- 4) A format presentation of an illustrative "preliminary" Implementation Plan for a Ten-Year Title XII Program in the YAR (see Attachment No. 2).
- 5) A brief program statement for a suggested CID program component designed to upgrade the staff work capability of the Planning Projects Division of the Directorate of Planning and Statistics (including (a) Objective Statement, (b) Justification, (c) Timeframe, (d) Inputs and (e) Expected Outputs--Attachment No. 1, Part 5.1).
- 6) Indepth discussion with the Design Team Leader, various team members and USAID personnel about a proposed program in irrigation on-farm water management in the Tihama Desert Region.
- 7) Participation in a limited (but insufficient) number of Design Team group discussions about the elements to be included in the YAR Title XII program paper.

Conclusions

- 1) At the present time, conditions in the YAR are prime for achieving a rapid and cost-effective rate of growth in the agricultural sector as there is now a receptive attitude among farmers for capital-labor substitutions. Unlike the situation found in most developing countries the YAR has (a) almost a total lack of unemployment (or under-employment) in the agricultural sector; (b) most rural farm families

have recently acquired fairly large quantities of discretionary income (from migrant worker remittances) for investment in modern inputs; (c) in-country effective demand for agricultural products (and an emerging export potential, at least to Saudi Arabia) far exceeds current levels of production; (d) agricultural resources are currently used inefficiently, particularly irrigation water in the Tihama, and there is still an unexploited potential if cropping systems consisting of high value crops are adopted; (3) the transportation component of the infrastructure is fairly adequate; and (f) the YAR has a strong market-oriented economy with minimum government interference.

- 2) There are significant regional differences in agricultural development potential in the YAR. Listed in order of decreasing potential (in an economic efficiency sense) these regions are: (1) Tihama Desert; (2) Southern Upland Slopes; (3) Southern Highlands; (4) Northern Highlands; and (5) Eastern Slopes (see map and description of these regions in the Section 3.1 draft copy of the REE Baseline Study report).
- 3) At present the MOA has in place the major organizational components of its Ministry for working with a modern agricultural sector--but only down to the Director level; however, its program management, evaluation and implementation capability is still extremely weak.
- 4) A CID Title XII program can make effective inputs into YAR's agricultural development process which can avoid duplication of efforts by other donor agencies while capitalizing on its member universities' strengths in training, research, extension and technical assistance.

Design Team Strengths

- 1) Most of the team members had had considerable prior experience in international development program design and/or implementation.
- 2) With the exception of an expertise gap in dealing with self-sustaining rain fed agriculture (for Region 2), expertise in various necessary types of agricultural potential in the YAR was present in the Design Team, ranging from irrigation management; to dry-land crop production; to range and forestry land conservation; to assessing social impacts and the future role of women.

- 3) Team members were given ample time to observe YAR agricultural conditions in the field and availed themselves of these opportunities
- 4) Team members had a number of meetings and discussions with USAID and MOA personnel in their areas of expertise.
- 5) Representatives from AID/Washington and BIFAD were made available on TDY to work with the CID Design Team.

Design Team Limitations

- 1) Design Team Leader's lack of prior overseas experience and unfamiliar with agricultural potentials in developing countries in general and in the YAR in particular.
- 2) Size of the team and tight time frame precluded the preferred option of having the total team in-country at the same time--thus, both the Baseline Study report and the Title XII project paper will not truly be "team" products.
- 3) Severe project paper completion deadline which will likely preclude team members from seeing the total product in draft stage or to make final inputs at that point before submission to AID/Washington. (If at all possible this should be reconsidered, even if team members have to travel to Washington, D.C. for this opportunity).
- 4) USAID personnel movements while Design Team was in country (home leaves and replacements) held team member--USAID personnel interaction below desired levels.
- 5) At this stage, MOA and donor agency representatives have not yet been active participants in program design (but this is necessary and may still occur).
- 6) Needed format of the contracting documents (e.g., P.P. and PID's versus Collaborative Agreement style) not resolved early enough, which limited the effective level of inputs by some Design Team members.

Recommendations

- 1) CID Title XII Program Components

Refer to Section 5.0 of Attachment No. 1--all the components listed appear to be viable and should be seriously considered for inclusion,

/

subject to YAR's MOA acceptance and CID's delivery capacity--above all don't promise more than we can reasonably expect to deliver.

2) Operational Elements

1. CID should have a viable Chief of Party identified before program paper is submitted in final form--with an opportunity to make his inputs.
2. Principal YAR/CID field party members should have fluency in Arabic.
3. Don't put an overdependence on TDY faculty inputs except where "recurring visits" are possible--such as in association with YAR participant trainees enrolled in degree programs at CID universities or in designing specialized future program elements.
4. Although time constraints may preclude completion of the Baseline Study Report in-country, it should nevertheless be completed at a later date because it will be a valuable reference document in its own right, independent of the CID Title XII Project Paper.

Concluding Comments

On balance, I found my CID Design Team assignment in the YAR to be a stimulating professional experience and I do believe that I was able to make effective contributions in my areas of expertise. I do have one complaint, however, that I want to make a matter of record. At various times, comments were made to the effect that my participation was for purposes other than to achieve the most viable team product possible--ranging from charges of "free-loading" to deliberate efforts to high-light CSU's areas of expertise. I do resent such charges but take consolation from the fact that those active in the development community who know me also know full well that such an approach is simply not my style.

I sincerely believe that the CID program components that I have suggested; e.g. strengthening the program management and evaluation capability of the MOA, and implementation of an on-farm irrigation water management project in the Tihama Desert, are viable and should be seriously considered for inclusion in the Title XII project paper, whether or not CSU can contribute manpower to any of the CID program components that finally emerge is a premature question and not in my area of responsibility in any case. At this point I can only say, with

authority as Chairman of the Department of Economics at CSU, that we in Economic have neither the interest or the excess capacity to participate in the long-term field effort in the YAR at this time. But, on the other hand, I do personally have a strong interest in seeing a successful CID effort develop there and will be available for follow up discussions on this matter if you so desire.

KCN/kb

Attachments

cc: Bruce Anderson, CID
George Dennison, CSU
Russ Olson, AID/Washington
Morris Whitaker, BIFAD/Washington

Review Draft for Section 5. REE Baseline Study of the YAR

by

K.C. Nobe

(Outline)

5.0 Recommendations for Strengthening the REE System

5.1 Institutional Development Recommendations

5.11 Strengthening Existing Institutions

1. Institutionalize a program planning, coordination and project evaluation capability in the MOA (upgrade the staff work capability of the Directorate of Planning Division)
 - a. Planning and policy analysis
 - b. Project monitoring and evaluation
 - c. Agricultural census and statistics (data series)
 - d. Marketing and agribusiness analysis

5.12 Developing New Institutions--None initially; possibly a YAR Agricultural University later

5.2 Training Recommendations

5.21 Domestic Training

1. Agricultural Extension Workers
 - a. Ibb School
 - b. Surdud School
2. Rural Women--Extension Home Economics Learning Program

5.22 International Training

- a. Public administration, evaluation and agricultural economics oriented
- b. Research oriented
- c. Extension and Continuing Education oriented

5.3 Non-Human Capital Recommendations

5.31 Physical Facilities--varies

5.32 Equipment--varies

5.33 Library:

1. Establish Library and Extension Materials Center in the MOA

5.4 Technical Assistance Recommendations

1. Region 1 - Irrigation On-Farm Water Management Project (with TDA)
Vegetable research and demonstration (with Surdud School)
Fruit research and demonstration (from AID project)
2. Region 2 - Rain Fed Cropland Management Program (joint effort with SURDP, CARS and Ibb School)
3. Region 3 - Dry Land Crops and Range Management Research Program
Sorghum research (from AID project)
Millet research (from AID project)
Poultry Project (from AID project)
4. Region 4 - No program components but offer TDY assistance to donor projects
5. Region 5 - No program components

5.0 Recommendations for Strengthening the REE System

Introduction

The primary reason for carrying out an REE baseline study of the YAR at this time is to provide basic information for designing a Title XII long-term program for assisting the YAR in attempting to achieve rapid economic development in its agricultural sector. The basic objective of the CID Title XII program effort in Yemen is to provide direct technical support for the preferred USAID strategy option as set forth in its Country Development Strategy Statement: FY 1981.

The strategy we propose is a more accelerated approach to building Yemen's human resources base and its capacity for planning and implementation--at both central and local levels--of development programs which will have equitable and beneficial impact. 1/

Specifically, the CID Title XII program is designed to provide continuity in implementing a long-range development program for the agricultural sector and related rural development programs; e.g., "...the strategy we propose generally speaking, long-range." 2/ Since a large number of donor agency funded agricultural projects are already in operation in the YAR, design of CID program will be guided by an effort to avoid duplication while identifying gaps and making complementary contributions that are evident in its areas of professional expertise. Further, the Strategy Statement specifies that

In Agriculture, we expect an increased flow of benefits from our continuing research efforts and expansion of recently initiated outreach programs. The main progress, however, will have to be made in the establishment and strengthening of agricultural support institutions (research, training, extension) and in the enhanced capacity of the Ministry of Agriculture to plan and coordinate the complex task of agricultural development. 3/ (Note: underlining added for emphasis.)

Major program components that could be included in the CID Title XII effort appear to be:

1/ Country Development Strategy Statement: 1981: Yemen, USAID, Sana January 1979, p. 38.

2/ Ibid., p. 41.

3/ Ibid., p. 58.

1. Institutionalize a program planning, coordination and project evaluation capability in the Ministry of Agriculture. A direct linkage to the Planning Projects Division of the Directorate of Planning and Statistics would be most beneficial. At this level, CID can assist by providing training opportunities for division personnel and in assisting them on-the-job with doing effective staff work for the top level MOA decision makers. For example, high priority consideration should be given to development of a YAR agricultural water development and management policy.
2. Provide staff and logistical support for domestic training programs; e.g., the emerging agricultural extension training schools at Ibb and Surdud, with capability to teach farm business management courses, as well as the conventional extension curriculum, and to provide funds and opportunities for YAR women in a Rural Women Extension-Home Economics Learning Program (RWE-HELP). Future consideration should also be given to assisting in the development of a YAR agricultural college program.
3. Provide opportunities for MOA administrators and technical employees to receive university level training abroad in one of three areas of concentration:
 - a. Public administration, evaluation and agricultural economics;
 - b. Research oriented degrees in the basic agricultural sciences; or
 - c. Extension and continuing education oriented programs.
4. Establish an Agricultural Information and Learning Program in the MOA, consisting of an agricultural library and an extension materials center.
5. Implement a series of field level technical assistance programs, possibly including but not necessarily limited to the following components, disaggregated by regions:
 - a. Region 1 (Tihama Desert) - In association with the TDA, an irrigation on-farm water management program, with emphasis

on introducing a high-value cropping system including vegetables and fruits, and within the manageable limits of the region's water supply.

- b. Region 2 (Southern Upland Slopes) - In association with SURDP, CARS and the Ibb School, develop a self-sustaining, rain fed cropland management program; assume responsibility for the USAID poultry project.
- c. Region 3 (Southern Highlands) - Initially begin a basic research program in managing extremely limited moisture conditions with an intent of eventually implementing a full-scale dry land area crop and range management program.
- d. Region 4 (Northern Highlands) - Over time, extend the activities set forth for Region 3 and assist donor funded area-based projects.
- e. Region 5 (Eastern Slopes) - No Title XII activities planned in Phase 1 at this time.

In the following sections, a summary program component statement will be provided for each of the above listed recommendations, using a format of: a) component objective, b) justification, c) time frame, d) inputs (including staff FTE and budget) and e) expected outputs. Finally, a preliminary program implementation plan for the proposed ten-year CID Title XII program will be presented. (Note: Only the first component presented in this draft).

5.1 Institutional Development Recommendations

5.1.1 Strengthening Existing Institutions - The primary CID effort in this program component should focus on institutionalizing a program evaluation and management capability in the MOA.

Objective: To effectively upgrade the staff work capability in the Planning Projects Division of the Directorate of Planning and Statistics and to formulate and implement an agricultural sector water development and management policy.

Justification: The MOA in its current state of evolution is still extremely weak in terms of its ability to carry out effective sector planning, program management and program component and/or project evaluation. Under MOA's organizational structure, such functions should become operational in the Planning Projects Division. At this level and succeeding higher levels where MOA policy decisions are made, there are IDA-funded expatriate

policy advisors in place. But these policy advisors and their MOA counterparts are presently constrained in their effectiveness because of limited and relatively low quality staff work at the Division level. Therefore, CID could make a valuable and nonduplicative input here by providing on-the-job assistance in staff work activities and training and by providing opportunities for a limited number of MOA employees to receive formal degree level training abroad in public administration, project evaluation and agricultural economics. This proposed activity would be consistent with the current USAID Country Development Strategy Statement for the YAR; e.g., "In Agriculture, ...the main progress, however, will have to be made in...the enhanced capacity of the Ministry of Agriculture to plan and coordinate the complex task of agricultural development." 1/

Time Frame: This institution building activity is visualized as being a long-term effort and should be programmed for the life of the Title XII program or, as a minimum, a ten-year effort. It should begin immediately upon the arrival of the Chief of Party for the CID Title XII program and be expanded as internal MOA opportunities emerge (but within the staff capabilities of CID to service this program component).

Inputs: The most critical CID staff input will be that of the Program Chief of Party who should have his office located in the Division. This will provide day-to-day opportunities for the Chief of Party to interact with Division staff, the Director and his expatriate IDA counterpart. Within the first year of operation, one additional CID professional, fluent in Arabic and skilled in agricultural sector analysis, should be added to the CID field party. His primary function initially would be to assist the Division staff in their daily work program while providing some on-the-job basic training in analysis techniques. Through this process he should be able to identify some MOA employees adequately prepared to pursue university level degree training in public administration and agricultural economics. As each MOA employee departs for training abroad, a replacement provided by CID should be brought into the Division. Ideally, U.S. trained graduate students at the all but dissertation (AED) stage should be selected; they should have fluency in Arabic, a capability most likely to be found in students enrolled in U.S. degree programs who come from other Arabic speaking nations and/or former Peace Corps Volunteers who have worked in such countries.

1/ Ibid., p. 58.

Preliminary estimates of CID FTE staff and budget requirements, by years is provided in Figure 5.1.1.

Expected Outputs: The overall expected output by the end of a ten-year input period is a fully operational Planning and Evaluation Division in the MOA. Specific outputs include:

1. A direct MOA input in preparing the agricultural sector of the CPO's national five-year planning exercises.
2. Adoption of an operational agricultural water development and management policy for the MOA that is fully compatible with overall national water policy.
3. Improved subject matter, sequence, location and timing of individual donor funded projects.
4. Improved MOA programs in research and extension.
5. An established set of agricultural resource base and production output data series, starting with data from the first agricultural census and kept current by region and commodity.
6. An established set of marketing and agribusiness data series by region and commodity.

An ultimate organization framework for this fully functioning Planning and Evaluation Division, for illustrative purposes only, is shown in Figure 5.1.2. At the end of a ten-year assistance program, all section and branch level administrators should have received university degree training.

Fig. 5.1.1. Projection of CID FTE's and Budget Requirements for a Ten-Year Effort to Institutionalize a Program Planning Coordination, and Project Evaluation Capability in the MOA, YAR, 1979/80-1988/89.

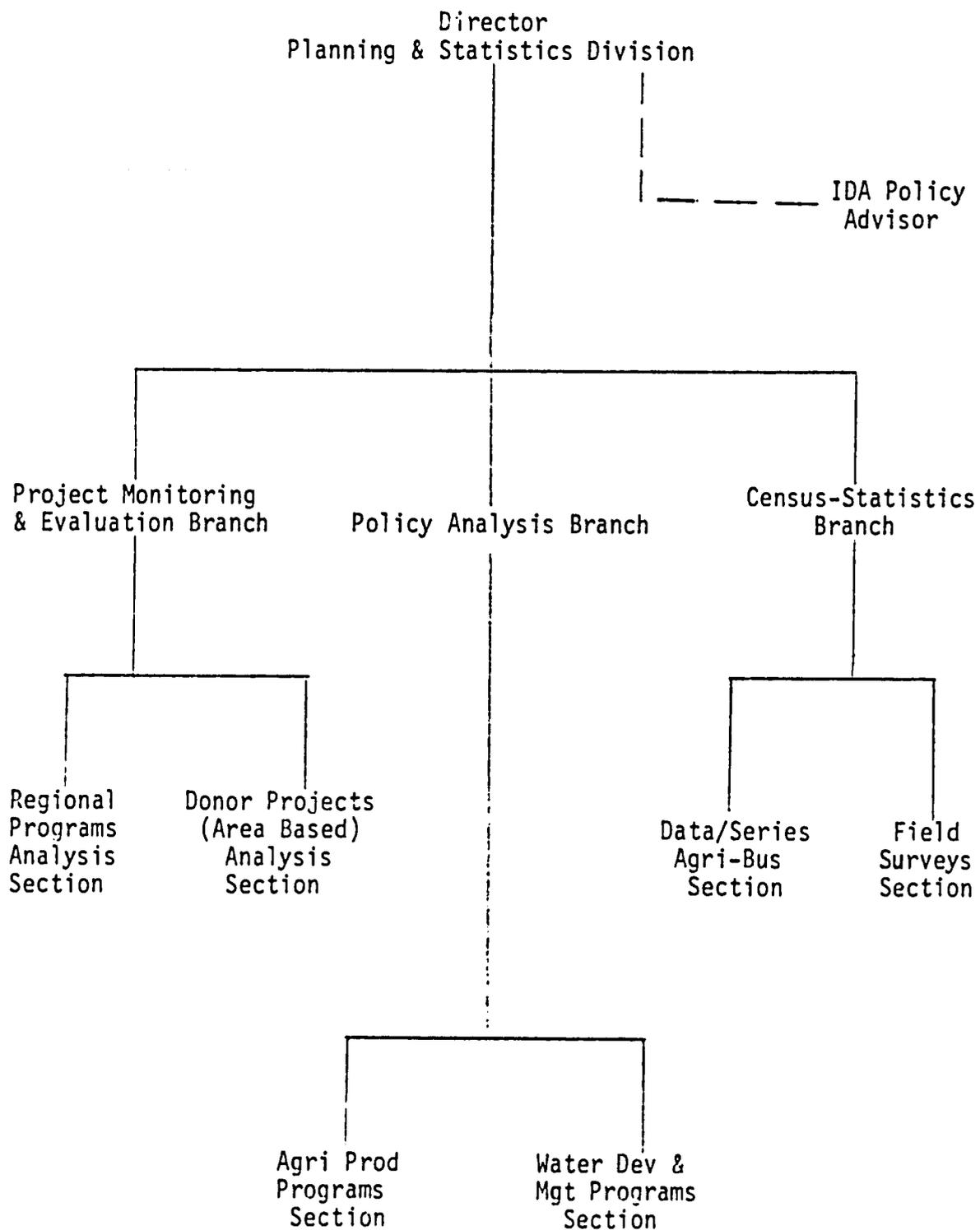
Categories	1979/80		1980/81		1981/82		1982/83	
	FTE Mo.	\$ ^{1/}	FTE Mo.	\$	FTE Mo.	\$	FTEm	\$
CID-U.S. Based								
Faculty	6.0	20,000	6.0	22,000	6.0	24,200	6.0	26,600
Secretarial	6.0	7,200	6.0	7,900	6.0	8,700	6.0	9,600
U.S. GRA's	(2) 6.0 (Ph.D)	6,000	(2) 12.0	13,200	(1) 6.0	6,600	6.0	7,300
YAR GRA's	(1) 3.0 (M.S.)	2,400	(2) 12.0	10,600	(2) 12.0	11,600	12.0	12,800
Sub-Totals		<u>35,600</u>		<u>53,700</u>		<u>51,100</u>		<u>56,300</u>
CID-YAR Based								
Chief of Party ^{2/}	6.0	23,000	6.0	25,300	6.0	27,800	6.0	30,600
Sector Analyst	6.0	20,000	12.0	44,000	12.0	48,000	12.0	53,200
Secretarial	6.0	7,500	6.0	8,300	6.0	9,100	6.0	10,000
U.S. Res. Assoc.	-	-	12.0 (Ph.D)	13,000	12.0	14,300	24.0	31,500
YAR Res. Assoc.	-	-	6.0 (M.S.)	5,300	12.0	11,700	24.0	25,700
YAR Hourly	-	5,000	-	10,000	-	20,000	-	30,000
Sub-Totals		<u>55,500</u>		<u>105,900</u>		<u>130,900</u>		<u>181,000</u>
Total Personnel Costs		<u>91,100</u>		<u>159,600</u>		<u>182,000</u>		<u>237,300</u>
Fringe Benefits								
Retirement								
Overseas Differential								
Sub-Totals								
Overhead								
U.S. Based								
YAR Based								
Sub-Totals								
Other Direct Costs								
Equipment-Vehicles								
Supplies								
Moving Costs								
Travel								
Per Diem								
Insurance								
Housing								
Utilities								
Sub-Totals								

^{1/}Assumes an annual 10% inflation rate in all cost categories.

^{2/}Assumes 50% of Chief of Party's time charged to this program component.

Total Project Costs

Fig. 5.1.2. Proposed Structure of a Planning and Evaluation Division, MOA



Preliminary Implementation Plan for a Ten-Year
CID Title XII Program in the YAR

(by K.C. Nobe)

Year 1 - (1979/80)

1. Locate program coordination staff in Office of the Director for Planning, MOA
2. Begin on-the-job training program for Planning Division personnel while assisting these personnel in their daily staff work
3. Begin formal training program
 - a. Ibb School (domestic)
 - b. Send first group of MOA employees abroad for degree training (concentrate on training administrators and program directors, regardless of discipline)
4. Assume responsibility of USAID's Poultry Project
5. Assume responsibility for USAID's Sorghum/Millet Project

Year 2 - (1980/81)

1. Supplement Planning Division's staff with U.S. trained ABD's to replace employees abroad for training (use former Peace Corps and/or foreign national students with Arabic capability)
2. Establish field office for Irrigation On-Farm Water Management Program in Region 1 (Tihama), attached to TDA
3. Start Library and Extension Materials Learning Center in MOS
4. Send second group abroad for training (3 administration and 2 research)
5. Start Rural Women--Extension Home Economics Learning Program (RWE-HELP)

Year 3 - (1981/82)

1. Expand Planning Division's capability to include census data evaluation and start time series data sets; begin monitoring and evaluation of agricultural sector performance in 2nd Five Year Plan period

2. Begin Surdud Extension School effort
3. Extend Library and Extension Materials Learning Center with branch offices in TDA and SURDP (or CARS)
4. Place first graduates of RWE-HELP in field locations (preferably in association with ongoing TDA and/or SURDP programs)
5. Add fruit and vegetable research components to TDA on-farm water management component
6. Send third group abroad for training (1 admin, 3 research, 1 ext)

Year 4 - (1982/83)

1. Add marketing and agri-business analysis capability to the Planning Division
2. Establish field office for Rain Fed Cropland Management Program in Region 2 (jointly with SURDP, CARS and Ibb School)
3. Begin domestic training program for extension area supervisors and regional directors
4. Expand TDY CID personnel activity for support of donor programs active in YAR
5. Send fourth group abroad for training (2 research, 3 extension)

Year 5 - (1983/84)

1. Start Preliminary staff work in Planning Division for input into CPO's preparation of the 3rd Five Year Plan
2. Establish a field program for Dry Land Crops and Range Management (possibly locate near Sana to service both Regions 3 & 4)
3. Send fifth group abroad for training (1 research, 3 ext, 1 admin)
4. Assist in implementing first phase of a national extension system

Years 6 - 10 (1984/85--1989/90)

1. Continue with full-scale operation as developed during the first five years of the project but adjusted on the basis of changes made evident during the interim evaluation

2. Continue to send students abroad but vary number and mix in type of training as needed to meet critical shortage areas
3. Begin to phase out CID involvement in various program components which have become institutionalized and operable on a self-sustaining basis

SECTION H

INDIVIDUAL TEAM MEMBER REPORT
TRIP REPORT AND STATUS OF
THE IBB AGRICULTURAL TRAINING CENTER

NABIL KHALDI

MEMBER

TITLE XII DESIGN TEAM

SANA, YEMEN

Memorandum

To: Consortium for International Development
From: Nabil Khaldi
Subject: Report on Trip to Egypt, Jordan, and Syria and Report of Status of Ibb/ATC

I. Report on Trip to Egypt, Jordan, and Syria - July 2-12, 1979

Purpose:

1. To collect curriculum models and teaching materials.
2. To identify and gather information on possible expatriate candidates to staff the Ibb Center.
3. To gather information on the status of Yemeni students studying agriculture in Egypt.
4. To establish contacts with officials and experts in agricultural education in these countries.
5. To visit agricultural secondary schools.

A. Egypt:

1. An arrangement was made with officials of Agricultural Education at the Ministry of Education to obtain textbook materials currently used in Egypt' agricultural secondary schools. A complete set of the books for a three year secondary program is placed in the Ibb/ATC file.

2. The following documents have also been obtained from the Director of Agricultural Education at the Ministry of Education.

- a. Curriculum models for agricultural secondary schools in Egypt (Arabic document).
 - b. The by-laws of agricultural education in Egypt. (Arabic document)
 - c. A list of Arabic Library References (Arabic document).
 - d. A copy of a four week training program for farm labor, technicians, and extension workers.
 - e. A copy of a working program for student cooperative marketing and other agricultural activities.
3. Meetings, Contacts with Officials and Experts

a. Meetings:

1. Dr. Mohammed Nabih Mouhsin, 1st Deputy Minister for Technical Education-Ministry of Education.

Purpose: To secure copies of textbooks for possible use at Ibb/ATC. Also, explore the possibility of identifying some qualified technical expatriate staff as candidates for Ibb/ATC.

2. Mr. Fakhry El Meannawy, Director of Technical Office of Agricultural Education - Ministry of Education.

Purpose: Secure several documents (curriculums, by-laws, etc.). Also, arrange for a visit to TANTA Secondary Agricultural School.

3. Meetings with specialists of FAO Regional Office: Dr. A. El Jaff, Mr. Salah Nauh and Dr. Adnan Schuman.

Purpose: To gather information on agricultural secondary schools and agricultural training centers in Egypt, Syria, and Jordan.

4. It was understood during the meetings with the Agricultural Education Officials that there was a request last February by Ministry of Education to MOE of Egypt to nominate Egyptian Technicians to work in the fields of crops, animal science, general agricultural, food processing and farm machinery (presumably for Ibb/ATC). MOE in Egypt nominated the following ten specialists:

- a. Agronomy: Mr. Fakhry El Meannawy
Mr. Hussain Mouhamed Ashour
- b. Animal Science: Mr. Mugib Sayed Naji
Mr. Malak Iyad Mukkar
- c. Food Processing: Mr. Abdul Ghani Gharabah
Mr. Mouhammed Ahmed Kamil
- d. Mechanization: Mr. Jabri Mouhammed Ahmed El-Najdi
Mr. Ahmen Salama Abu El Khair
- e. Generalists: Mr. Hussain El Dasouki El-Mersawi
Mr. Yahia Abdul Hamid Hassan

5. Yemeni students studying at Kafir El Shik: The following is a list of 10 students who are part of USAID trainees studying agriculture in Egypt since 1975. I was informed that about 8 of the following students are expected to successfully complete their degree requirements by the middle of August.

<u>Name</u>	<u>Major</u>
1. Roman Hassan Saad El Din	Agricultural Economics
2. Said Abdulla Hamouda	" "
3. Abdul Elah Abdullah Ahmed El Madani	Agricultural Production
4. Abdul Rahim Roman Naji El Kudsi	Soil
5. Abdul Aleem Saif Abdulla	Soil
6. Isam Abdul Rahman Abdul Kadir Kaid	Animal Production
7. Najib Kasim Farie Saiel	" "
8. Najib Abdu Mouhamed El Ali	Agronomy
9. Yousif Ghalib Hassan	Animal Production
10. Abdul Elah Kaid Hussain Tabbal	Agricultural Economics

B. Jordan

1. An arrangement was made with officials of Agricultural Education to obtain textbook materials currently used in Jordan's agricultural secondary schools. A set of the textbooks obtained was placed in the Ibb/ATC file.

2. The following documents have been obtained from the Director of Agricultural Education at the Ministry of Education.

- a. Curriculum models for agricultural secondary schools in Jordan (Arabic document).
- b. The by-laws of agricultural education in Jordan (Arabic document).
- c. A list of Arabic library references (Arabic document).
- d. A copy of a special program for training Saudi students on extension activity in Jordan, 1967. (Arabic document)
- e. A copy of a special program for training Saudi students on plant and animal protection in the Jordan Shuback Agricultural School, 1967 (Arabic document).
- f. A copy of a special program for training Saudi students in veterinary science in the Jordan Shuback Agricultural School, 1967 (Arabic document).
- g. A copy of a program for student project on practical agricultural operations (Arabic document).
- h. Copies of a weekly food menu at the Shuback Agricultural Secondary School (Arabic document).
- i. Copies of order forms for food supplies, for expense of heating oil, and for ordering tools and commodities.

- j. Copies of applications for employment at the workshop, for enrollment at the school, for medical examination for employment and vacation.
- 3. Meetings, Contacts with Officials and Experts.

- a. Meetings:

- 1. Mr. Usamah Al Saeh - Director of Agricultural Education
Ministry of Education.

Purpose: To secure copies of textbooks for possible use at Ibb/ATC. Also, to explore the possibility of identifying some qualified technical expatriate staff as candidates for Ibb/ATC. To also work out a program for a visit to the Shuback Agricultural Secondary School.

- 2. Mr. Ahmed Fawzi El Sahib - Director of Curriculum and Teaching Materials - Ministry of Education.

Purpose: To secure textbooks and teaching materials for possible adoption at Ibb/ATC.

- 4. Others contacted:

Mr. Chalib Toffaha

C. Syria

- 1. An arrangement was made with the Agricultural Education Officials at the Ministry of Agriculture, to obtain textbooks and teaching materials currently used in Syria's agricultural secondary schools. A set of these textbooks was placed in the Ibb/ATC file.
- 2. The following documents have also been obtained from the Director of Agricultural Education at the Ministry of Agriculture.
 - a. Curriculum models for agricultural secondary schools in Syria (Arabic document).
 - b. The By-laws of agricultural education in Syria (Arabic document).
 - c. Detailed planned lectures for plant protection, farm-management, mathematics, poultry, field crops, apiculture, extension, food processing, horticulture, soil fertilizer, mechanization, forestry, animal science, agricultural cooperatives, Arabic, language, biology, chemistry, physics, religion, French, maintenance and repair, tractors, electricity, motors, water pumps, bookkeeping, soil, agricultural mechanization (Arabic documents).

3. Meetings, contacts with officials and experts:

a. Meetings:

1. Mr. Salim Kahwaji - Agricultural Education, Ministry of Agriculture.

Purpose: To secure copies of textbooks for possible use at Ibb/ATC.

2. Miss Siham Rifaieh - Training Section - Agricultural Education - Ministry of Agriculture.

Purpose: To explore the possibility of identifying some qualified technical expatriate staff as candidates for Ibb/ATC.

2. The Budget: A detailed outline of the budget, which is also proposed by the UNESCO Advisor, when approved, will define the extent of YARG financial responsibility for the Ibb Center. The proposed budget amounts to nearly \$1.5 million dollars, of which one third is to be allocated for salaries of the Yemeni supporting staff. It is anticipated that both the Bylaws and the budget will be approved sometime during the month of August.

III. Final Remarks

A. Physical Facilities: Although the construction of the physical facilities at the Center is supposed to be completed by the 14th of August, it will be almost impossible to meet this specified date. Construction work during the fasting month of Ramadan (July 24-August 24) is expected to be virtually at a standstill, particularly from the 10th of August through the end of the month. However, the situation might not be completely hopeless, if the Center opens only on a partial basis in October 1979 (that is on the basis of part of the facilities being completed).

One possibility - which requires a shift in the priorities on the part of the contractor - is to concentrate on completion of the following facilities by the end of next September.

1. Completion of the School Building where the ground floor will consist of a library and a staff room, while the top floor will have 2-3 classrooms as well as a small storeroom according to construction design.
2. Completion of Kitchen and Dining Facilities (these are near completion stage).
3. Completion of Housing Staff and Technicians (these are also near completion stage).
4. Building of a bridge that spans the wadi, and paving the access road so that commodities and supplies may be brought inside the campus.
5. Completion of digging and testing of the well and the completion of installation necessary to provide water supply to at least some parts of the Center.
6. Completion of the necessary installation to connect with the generator in order to provide electricity for part of the Center.
7. Completion of plumbing installation for at least part of the Center (including toilet facilities).

7

B. Farmland for the Center - This is an extremely important issue, as the Center can not function without an appropriate land area for the school farms. Acquisition and fencing of the additional farmland area should be handled as soon as possible by a committee representing the Ministry of Education, the Governor of Ibb, the contractor and representatives of USAID/CID. The committee should take steps on the spot to delineate the land area, so that fencing may take place without delay.

C. Student Recruitment: One of the Ministry of Education inputs is student recruitment. The Bylaws specify policy requirement and incentives for student recruitment. The mechanism will be to publicize through the news media information about the Ibb/ATC in various areas of the country. This mechanism will not start before the Bylaws and the budget are already approved. However steps should be taken as soon as possible to prepare some sort of brochure describing the objective of the Center, the opportunities that it will provide its students as well as the rural communities at large. This type of information should be made available to MOE officials so that it can be incorporated in the recruitment activity.

D. Yemeni Staffing: No steps have been taken so far to identify the Yemeni supporting staff, as these activities must await the approval of the budget. However, several steps may be taken to initiate processes for identifying Yemeni Personnel.

1. A number of eligible technicians may be identified through the British Mechanization School in Taiz, the German Vocational School and the Veterinary Secondary School in Sana.
2. It is anticipated that a number of Yemeni Staff (technician, administrators, etc.) will be needed prior to the starting of school. Officials of MOE may be alerted to these needs in advance so that an early process could be initiated to identify and select candidates as the need arises.
3. A possible development of a joint effort with officials of MOE to provide an additional source of staff-candidates through media advertisement to assure availability of more qualified personnel for Ibb/ATC.

E. Animals and Poultry for the School Farms: The proposed budget allocates nearly \$75,000 for acquisitions of dairy animals and poultry for the school farms. UNESCO Advisor to MOE is planning to approach MOA for the possibility

of obtaining about 19 of the 70 dairy cows which MOA is expecting to receive by next October. This possibility should be actively pursued with the officials of MOA, otherwise, it will be a long time before dairy animals will be acquired through other sources for the school farm.

F. The Yemeni Counterparts: Several Yemeni counterparts have already been identified as candidates for Ibb/ATC. In addition, there are a number of students who are expected to graduate from Egyptian Universities during the first half of August. (See Trip Report) Priority in selecting among candidates for Ibb/ATC should be geared towards graduates in those fields which will be taught during the first year at Ibb Center (animal science, agronomy, horticulture, extension, etc). Furthermore, it might be possible at the beginning to involve these Yemeni counterparts in the student recruitment activity, in the collection of relevant data to the Center, and perhaps in some temporary administrative duties.

A substantial portion of the activities described have been initiated during the period which is covered by this report (Matteson-Khaldi), while other activities will have to be initiated shortly if the objective to start the school year at Ibb/ATC by October, 1979 is to be met.

Finally, an active process of follow-up on all activities and outstanding issues should be put into effect no later than the first week of September (immediately after the Ramadan Holiday).

SECTION I

INDIVIDUAL TEAM MEMBER REPORT
TRIP REPORT, REVIEW OF ACTIVITIES
AND
RECOMMENDATIONS
OF
HAROLD R. MATTESON
MEMBER
TITLE XII DESIGN TEAM - IBB/ATC
SANA, YEMEN

To: Individuals interested in the Ibb/ATC project
From: Harold R. Matteson, CID Project Director for Ibb/ATC
Subject: July 9 to August 7 Trip Report

As most of you know, I spent four weeks in Yemen beginning July 9th with the purpose of becoming familiar with the Ibb/ATC project and taking whatever steps I could to move the project forward. Dr. Nabil Khaldi preceded my arrival in Yemen and was with me during the entire four weeks. The activities in which I was involved can be grouped under three major areas. (1) Writing and editing the Ibb/ATC project paper (which took nearly 2 weeks); (2) Identifying resources available in Ibb/Taiz area for the Training Center and (3) Dealing with specific problems regarding the opening of the Agricultural Training Center.

In an attempt to keep the body of this report as brief and readable as possible, I have included information regarding items 1 and 2 above in Appendix A and B. Thus I will focus on Item 3 in the remainder of this report.

THE IBB/ATC SCHOOL

Location--The Ibb Agricultural Training Center (ATC) is located on the outskirts of the city of Ibb. The City of Ibb is located approximately 3½ to 4-hour drive south of Sana and approximately one hour drive from Taiz.

Construction--The ATC Campus is composed of 10 faculty houses, 4 dormitories with 16 rooms each, a cafeteria, one large building with classrooms, laboratories and offices, 2 apartment buildings for laborers and the farm buildings. Although the contractor has made considerable progress in fulfilling his contractual obligation to complete all construction and install all utilities and equipment by August 14th, we find it difficult to believe that he will have accomplished this goal by the end of September.

During my visit, we met with Dr. Shehata from the World Bank three times to discuss various issues and problems regarding the preparation of the Ibb/ATC buildings and facilities prior to the end of September.

Appendix C includes a letter I sent to Dr. Shehata which summarizes the major points discussed at our July 25th, August 2nd and August 4th meetings.

Land

In 1976, when the Ibb project was initiated, the MOE wrote a letter to the governor of Ibb requesting approximately 50 hectares of farm land for the Ibb/ATC. It appears that this action did not receive proper follow-up and some of the land which was initially allocated for the school is being used for other purposes i.e. building a football stadium. The acquisition of enough appropriate land to allow students to conduct individual and/or group projects and to allow some area for farm production is a basic ingredient for achieving the goals and objectives of Ibb/ATC. We expressed our concern to the Minister of Education and the World Bank staff. We were told that action would be taken to acquire this land.

Commodities and Equipment

The World Bank has purchased nearly a half million dollars worth of equipment and laboratory supplies for this school. They will also provide two Nissan (Patrole) and one 40-60 passenger bus. All of these items are in Yemen waiting to be moved to the school. Once construction is completed, World Bank will move and install all of this equipment. CID and/or Ministry of Education (MOE) has the responsibility of inventorying this equipment once it arrives at the Training Center. This will probably not occur before mid-September or later.

Housing

Initially it was believed that the ten staff houses on the Ibb/ATC campus were for expatriate staff. However, we were informed by the Ministry of Education that these houses would be for the Yemeni counterpart staff. Thus, we plan to purchase 10 double size mobile or prefabricated homes and place them at the Center for the expatriate staff. In the meantime, however, expatriates will have to find housing in Taiz or Ibb.

Training

Through this project, 30 Yemeni counterpart staff will be sent to the U.S. for M.S. degrees and 12 graduates from Ibb/ATC will be sent to mid east universities for B.S. training. In addition 24 person months of non-academic training will be provided in support of this project.

References and Textbooks

Currently, no textbooks and very limited references are available in Yemen for the Secondary Agricultural School such as the one proposed in this project. Thus, after considerable discussion the MOE and CID staff agreed to acquire the majority of the textbooks (in Arabic) from Egypt and Jordan. During our trip to Egypt we discussed this matter with Dr. M. N. Mohsen, First Secretary of State for technical Education, Minister of Education. Dr. M. N. Mohsen offered to supply all the textbooks we requested for Ibb/ATC free of charge. He needed, however, a letter from USAID/Yemen requesting the textbooks we wanted. Subsequently a letter was prepared and is being sent by USAID/Yemen through USAID/Cairo to Dr. Mohsen. These books will be delivered by the ministry to the USAID office in Cairo and we will have the responsibility of transporting them to Yemen.

A similar arrangement was made with the Ministry of Education in Jordan for the textbooks we will be using from Jordan. Once again initial arrangements have been made to acquire and transport these books to Yemen prior to beginning of school. Nars Rohaiem, who we will hire as one of our teachers at Ibb/ATC, will be traveling to Egypt in August. We have asked him to check on the textbook situation and do whatever is necessary to facilitate their transportation to Yemen. It is very possible that someone will have to do the same type of follow-up for the textbooks we have requested from Jordan.

We will need a number of good references in English for the Ibb/ATC library. I took to Yemen single copies of 14 different agricultural books which are frequently used by our vocational agricultural instructors in the United States. I will be soliciting assistance from the Agricultural Education Departments in the CID universities for the identification of additional reference books and materials.

Students

There is considerable uncertainty as to whether we will have any students when the school opens in September. The Ministry of Education staff has informed us that recruitment can not begin prior to the approval of the Bylaws by the Ministry of Education and his advisory committee. The Bylaws were prepared and forwarded to the Minister at least 2½ weeks prior to my departure from Yemen.

It is extremely unlikely that 90 candidates will be recruited by the end of September. We feel this is fortunate since it would be extremely difficult to operate the school with more than 20 students for the first year. If we have no students the faculty will spend their time on developing the curriculum, on recruiting students for next year, on the organization of the administrative functions of the school and on providing training programs for the farmers in the Ibb/Taiz area.

Expatriate Staff

Providing adequate expatriate staff for this project is an item which will need continuous attention. We have made, however, considerable progress in this area.

Ultimately there will be 10 expatriate staff employed through this project. For the first year, however, only six staff will be required. These are:

(1) expatriate team leader/co-director of Ibb/ATC; (2) animal science teacher; (3) agronomy teacher; (4) horticulture teacher; (5) extension/rural sociology teacher and (6) extra curricular activities coordinator. Following is a brief discussion of the progress we have made toward staffing these positions.

1. Expatriate Team Leader/Co-director

Both AID and the Yemen government have recommended that this position be filled by an American. We are actively seeking candidates for this position and appreciate assistance from CID executive office and member universities. Since the responsibilities and duties of this position are quite comprehensive, we have decided to develop the position of Assistant Team Leader/Deputy Co-director. This will be a part time position and will be filled by one of the expatriate teaching staff.

2. Animal Science

Although we have identified two reasonably good candidates for this position, we would like to identify and interview additional candidates in the United States before making a final decision. The candidates we have identified are:

a. Mogeeb Sayed Nagi--Mogeeb is the most experienced candidate we interviewed. He has nearly twenty years of experience. Among his experiences were foreign assignments in Tanzania and Afghanistan. He speaks good English and is very interested in joining the Ibb/ATC expatriate staff. He is an Egyptian.

b. Ghaleb Mustafa Tuffaha--Mr. Tuffaha has less experience but more training than Mr. Nagi. In addition to his B.S. degree, Mr. Tuffaha has just completed a nine month teacher training program in Holland. He has 6-7 years of experience--five as a high school agricultural instructor and approximately one and one half years as an administrator of this school. His english is adequate and he seems to have a good understanding of the type of school we are trying to develop at Ibb.

3. Agronomy

The candidates we have identified and interviewed for the agronomy position are as follows:

a. Abdullah A. Jaradat. We met and interviewed Mr. Jaradat at the University of Jordan where he is finishing his MSC degree in agronomy. He is the best agronomy candidate we have interviewed and he was highly recommended by the Dean of the College. He has teaching (high school) experience in both Jordan and Saudi Arabia. In addition he was manager of an irrigation project in Jordan prior to enrolling in his master's degree program. Both Dr. Khaldi and I were very impressed with the candidate and would feel comfortable offering him the agronomy position on the Ibb/ATC staff.

b. Amin Yousuf Abushaer. Mr. Abushaer obtained his MS degree from New Mexico State University in 1968. During his professional career, he has had a wide variety of administrative and teaching experiences. He is also a Jordanian and both he and Mr. Jaradat appear to be available for employment in September.

4. Horticulture

We interviewed both an Egyptian and a Jordanian for this position. Although we weren't completely satisfied with either candidate, we feel Mr. Mahmood A. Kasrawi was certainly the better candidate and could perform very adequately under appropriate supervision. Mr. Kasrawi, is completing his MS degree at the University of Jordan and has 5 years of high school teaching experience. Three of these years were in an agricultural secondary school similar to Ibb/ATC. We feel he has the capacity and attitude for growth through his participation in this project.

Yemen to pick up the textbooks we requested.

5. I recommend that we identify an individual specialized in educational administration and who has practical administration experience as a high school principal and have this individual go with me to Yemen. He could assist in the preparation of an administrative plan for the Ibb/ATC.

6. A list of references in English should be compiled by the end of August so that we can initiate the purchase of these items. Once again assistance from the Agricultural Education Staff at CID universities will be appreciated.

7. The administrative procedures for paying expatriate non-American staff in Yemen must be developed and functional by the end of September. Also, we need to determine how staff will be reimbursed for housing and how furniture will be provided for them.

Recommendations

1. We have recommended to the Minister of Education that the opening date for Ibb/ATC be October 1 rather than September 22nd as originally suggested. He appeared to accept our recommendation. These extra two weeks will allow more time for staffing and completion of facilities and installation of equipment.

2. I recommend that the following conditions exist at the Ibb/ATC before the expatriate staff begin working at the Center:

- a. One half of faculty housing completed and ready for occupancy.
- b. At least one dormitory completed and ready for occupancy.
- c. The cafeteria completed and ready to prepare and serve meals.
- d. At least one half of the school building ready for use (this should include the library).
- e. The electricity, water and sewage all functioning properly.
- f. A decision is made regarding land for student projects and the school farm.
- g. The flooding problem has been corrected.
- h. Operational funds for 2-3 months are placed in the Bank at Ibb and are available to the school administration.
- i. The Director, 2 assistant directors, farm supervisor, residence hall supervisor and at least one half of the support staff be employed and at the Center.

3. USAID Yemen and CID representatives should explore alternative means of upgrading the Agricultural Education program in the Ministry of Education. The Department of Agricultural Education is grossly understaffed and finds itself in a lowly position with basically no power or authority. I feel it is important to elevate the position of Agricultural Education in the Yemen government if we expect to have a successful program at Ibb/ATC and ultimately at Surdud.
4. USAID Yemen and CID representatives should encourage the MOE to extend Dr. Basha's contract beyond the current duration of one year. Dr. Basha is "Mr. Agricultural Education" in the MOE. He is performing a valuable service to the Ibb/ATC project. His absence would be a severe blow to the program. If we want him to stay, however, arrangements will have to be made to lighten his load and reduce some the tremendous pressure which is currently placed upon him.
5. Action should be taken to determine if the mobile homes can be delivered to the Ibb school prior to the purchase of these units. We should explore the possibility of placing pre-fabricated homes at the school for expatriate staff instead of mobile homes.
6. The core team should be in contact with the CID project dir. of the Ibb/ATC program prior to making any decisions regarding the type and amount of administrative support needed by this project.

Resources Available in Ibb/Taiz Area

A. Extension Training Center--Taiz

An extension training center sponsored by FAO/World Bank, has been operating in Taiz since January 1975. The purpose of this center is to prepare extension agents for the Southern Upland Rural Development Project (SURDP) which is affiliated with the Ministry of Agriculture (MOA). Candidates for this training program should have completed a minimum of nine years of school. The extension center provide their students with nine months of training. Four months of this program are spent on technical subject matter and five months are spent on extension education activities. During the past five years, the Center has graduated 85 students of which 56 are employed by SURDP. This is far below SURDP current need of 108 extension agent

The Center's training staff offered to assist with the extension education offering at Ibb. They also suggested that their graduates be given an opportunity to attend Ibb and that their students be given credit for having completed the nine month program at the extension training center.

B. British Mechanization Project

The British government is conducting an one year introductory Agricultural Engineering course in Taiz for 10 Yemenis per year.

In addition, the mechanization project staff are involved in the following educational activities:

1. 2 - 1 week short courses each year for extension agents.
2. Farmer training extension programs for 50 farmers each year.
3. Evaluating the suitability of various farming equipment to the Yemeni situation.

The mechanization staff are willing to conduct short courses for Ibb students, to serve as a resource for the expatriate mechanization teacher and provide us with an, written reference material which can be used by faculty or students at Ibb.

We mutually agree that one of the mechanization course graduates could serve as a mechanization technician for the Ibb school.

C. UN/FAO - World Bank Research Project

The World Bank and UN/FAO are providing technical assistance for the Ministry of Agriculture research station in Taiz. This project will

eventually include all expatriate agricultural specialists which cover all basic agricultural disciplines with the exception of animal Husbandry and Forestry. Dr. Kamil Fouad, project manager indicated that he and his staff would be available to provide technical back-stopping for the expatriate and Yemeni staff at Ibb/ATC. He also offered the use of the MOA research station near Ibb/ATC and expressed his interest in using some of the Center's land for the MOA/FAO project.

D. Southern Upland Rural Development Project (SURDP)

Dr. El Khair El Amen, project manager of SURDP indicated that one of his major problems is recruiting qualified extension agents. He was very supportive of the Ibb/ATC school and indicated he would assist this school in any way he can.

The SURDP is a comprehensive rural development project which include rural credit, extension Home Economics, animal science and production and basic infrastructure items such as irrigation, water, roads, buildings, etc.

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To: Dr. Salah Shehata, Director General IDA Educational Projects
From: Harold R. Matteson, CID Project Director for Ibb/ATC Program
Subject: Problems discussed and decision made at our July 25, August 2nd
and August 4th meetings.

As you recall we met on July 25th to discuss a number of problems the CID team observed during our visit to the Ibb Agricultural Training Center on July 23, 1979. As a result of this discussion, we scheduled a meeting with your contractor to discuss a specific timetable for the completion of the construction and installation of utilities and equipment at the Training Center. Subsequently, we scheduled another meeting for August 4th since the appropriate engineer was not present for the August 2nd meeting. Following are the major points made at each of these meetings:

A. July 25, 1979

1. We stated that the contractor indicated to us that he was going to complete the staff housing first followed by the residence halls, school building and the farm buildings. You stated that the contract states that all building should be completed at the same time and that the target date is August 14, 1979.

2. You further stated that while you did not expect the contractor to meet the August 14th deadline, you were quite certain that all buildings would be ready for operation by the end of September and thus would not interfere with the opening of the school. This would include not only the completion of the construction but utilities would be hooked up and operating and all equipment would be installed and laboratories would be ready for operation.

3. Ishak Kuzman, from your office, stated that the well was dug but has not been tested or connected to the water system.

4. You indicated that the generator will be the source of electricity for all buildings on campus. Within 6 months to a year, however, Ibb will be placing an electrical line near the school at which time the faculty housing will be connected to the city (Ibb) for its electricity.

5. We indicated that the school had been flooded approximately 10 days ago. It was our judgment that the majority of the flooding was caused by the manner in which the Southern Upland Rural Development Project (SURDP) had dug the upper portion of the wadi. You agreed with us and indicated your office had advised SURDP that they would cause flooding problems by the manner in which they widened the wadi adjacent to their property. You warned SURDP that they would

be responsible for any flooding which would inevitably occur. You shared with us various communications you have had with SURDP, and the Ministries of Agriculture and Education regarding this problem.

6. You indicated that the bridge over the wadi has been designed and is ready for installation. Also, the World Bank has contracted for the fence around the school property but construction has not begun because no one seems to know the exact boundaries of this property.

7. You stated that the contractor is obligated to level and landscape the land surrounding all buildings on the campus. He is also responsible for the removal of all trash and rocks from the school grounds.

8. You indicated that the World Bank has a committee which will be responsible for checking the construction of all buildings and, the installation of utilities and equipment to determine if the contractor has met his obligations. This will be done prior to submitting the school facility to the Ministry of Education.

9. You indicated that reference books purchased by World Bank have been ordered and should be on their way to Yemen.

10. The bus for the Center was parked outside of your office building and two Nissan cruisers should have arrived in Yemen.

11. We agreed to meet on August 2nd at 11:00 a.m. with your contractor to obtain specific information regarding when the buildings will be completed and utilities and equipment will be installed.

B. August 2nd--11:00 a.m.

Mr. Mohamed Hasson was the only representative for the contractor present at this meeting. Unfortunately, he knew nothing about the problems at Ibb. The engineer responsible for the Ibb school was invited to this meeting but did not attend. We agree to meet once again on August 4th at 10:00 a.m. You indicated to Mr. Rashad that if the Ibb school engineer did not come to the August 4th meeting, that you would consider this to be a breach of contract. The remainder of this meeting was spent discussing and sharing information regarding the land for the school farm and student projects problems. We agree to raise the issue with the Minister of Education at our meeting on August 4th.

C. August 4th--10:00 a.m.

Mr. Abdul Wahed, contract representative for Ibb/ATC and Abdul Rahman El Rashid did attend this meeting. While there appeared to be a degree of uncer-

tainty on the part of Mr. Wahed, he submitted a timetable for the completion of construction at Ibb. The following items I gleaned from the subsequent discussion:

1. The contractor will not complete his contract by September 30, 1979. He indicated he would complete everything but the school building by the end of September.

2. We encouraged him to place greater emphasis on completing the school building and don't be concerned with completing all the dormitories and staff housing. He indicated he would do what he could but did not commit himself to an earlier completion date.

3. The question of the overall capability of the generator was raised. Your staff indicated it was 50 KW. You indicated this should be enough to initiate the Center's activities but the entire school be transferred to city electricity as soon as possible and use the generator as a back-up.

4. It was stated again that the well is dug but not tested and hooked up. The sub-contractor indicated he would complete these tasks approximately 2 months after he completed digging the well. That was 1½ months ago and he has not been around since. Also, there was some doubt as to whether the pump for the well has been ordered or is here in Yemen. I clearly indicated that water was critical to the operation of the Center and we could not begin operations at ATC without it.

5. You concluded this meeting by indicating that construction has been delayed 1-3 months (beyond September 30) and that it would be better to begin school operations after the first of the year. I agreed but indicated the final decision rests with the Minister of Education.

These are the major points I acquired from these 3 meetings. Since Arabic was spoken frequently, particularly during the last two meetings, I might have missed some key points. Please let me know if this is the case.

I truly have enjoyed working with you even though for such a short period of time. I truly wish you best of luck with your new job in Cairo and I am looking forward to seeing you in the future.

Meeting with Ministry of Education

August 4th

Following are the problems we discussed with Mohammed El Wageeh, Minister of Education on August 4, 1979.

1. Opening Date for School--We indicated that the contractor would not complete construction before the end of October. Thus September 22nd was not an appropriate opening date. I indicated there were two basic alternatives. Postpone the regular classes for one year and provide training for farmers in the community and take necessary steps to open the Center next year or if the Minister still insisted on opening the Center this year, postpone at least until October 15, 1979. Dr. El Wageeh felt he needed to open the school and agreed to October 15, 1979 as a starting date.
2. Approving the Bylaws--I indicated that we could not recruit students before the Bylaws for the Center are approved. Dr. El Wageeh indicated that he would be meeting with his educational committee on Wednesday August 8th at which time he expected the Bylaws to be approved.
3. Acquisition of Farm Land for the Center. We expressed our concern that at least some of the farm land initially allocated for Ibb/ATC is being used for other purposes. We indicated a minimum of 40 hectares was needed to adequately carry out the functions of the Center. He said he would check on this item and would acquire the land requested. He indicated, however, since some of this land may be promised to other agencies, he may need to acquire some land a short distance from the school in order to get 40 hectares.
4. Flooding of Ibb/ATC. We indicated that SURDP had improperly widened the wadi causing flooding on two occasions during the past month. He placed a call to the Ministry of Agriculture asking SURDP to get in touch with him. He said he would initiate action to correct the flooding problem.
5. Ibb/ATC Director. I asked when the new Director would be appointed. He said he planned to meet with the Minister of Agriculture in the next day or two and a decision should result from that meeting.
6. Status of Agricultural Education in MOE

I indicated that Drs. Basha and Harazi had done an excellent job developing the Bylaws and curriculum for the school. We also felt that Agricultural Education in the Ministry of Education needs to be up-graded in order to get the prestige and position it deserves in the Ministry of Education. He appeared to be non-committal regarding this suggestion.

14

II. Report on the Status of the Agricultural Training Center at Ibb (Ibb/ATC)

This report covers the period between June 20th and August 5th. It deals with the various issues, activities, and problems that may be considered important/necessary for the start of the first academic year at the Center by October 15, 1979. The report does not deal with the full-time activity that was devoted to working on the Ibb/ATC Project Paper which was completed on July 22.

Part I deals with the issues pertaining to the physical facilities. The non-physical issues will be covered in Part II. Part III contains final remarks.

I. Physical Facilities: There has been substantial progress in recent months in the overall construction of the project.

A. Under the regime of the new contractor, there seems to be noticeable progress in the building construction of staff housing (Yemeni housing) as well as housing for technicians. They can be considered to be near completion stage. However, the school buildings (four 2-story buildings consisting of classrooms, laboratories, administration offices, library) and the farm structures are still lagging considerably. The contract calls for completion of all physical facilities by the 14th of August. Construction work is proceeding according to the following priorities: staff housing, school buildings, and then the farm structures.

B. Electricity and Water Supply: At present, a generator (50 KW) is already placed on campus, but there is no electricity as the necessary installation has not yet been completed. Also, a well is already dug, but there has been no testing of the appropriate depth to determine the extent of water availability, nor has installation been completed to secure water supply to the campus.

C. Access to campus and the bridge over the wadi: There is no change on the status of the access road or the proposed bridge over the wadi that separates the end of the access road from the center of the campus site. The proposed bridge to span the wadi (5.7 meters width) has been contracted to be completed together with the access road and the rest of the physical facilities.

D. Flooding: For the past 2 months, flood waters have swept through the campus site twice. Their immediate impact resulted in considerable damage to the main pipes and installation and halted the construction work during the flood period. It is believed now that flooding poses a real threat to the campus installation and facilities.

E. Fencing and the Land Area: YARG has allocated funds for fencing which consist of galvanized steel tubes with wire mesh. The fenced area is supposed to include, in addition to the campus site, the farm land appropriated for the school. As of now, no arrangements have been made by the Ministry of Education, the Project Implementing Unit, to determine its size (dimension) or its demarcation. In 1976, the ex-Minister of Education, in a letter to the Governor of Ibb, suggested that a range of 58-80 ha. of land be appropriated as farm land for the Center. (It is understood that the immediate land area surrounding the site location of the Center does not exceed 30 ha.)

II. The Non-Physical Issues

A. Curriculum and Teaching Materials: The curriculum model which is expected to be adopted for IBB/ATC is developed by MOE and is basically a modified version of the curriculum prepared by the UNESCO/FAO advisor in 1977. (See Project Paper) Textbook materials have been gathered from several Arab countries (See Trip Report). It is expected that these textbooks will be used at the Ibb Center until the expatriate staff, in cooperation with their Yemeni counterparts, have had the opportunity to develop teaching materials more suitable to the Yemeni environment.

B. Staffing: AID inputs will consist of one long-term CID Team Leader/ATC Co-Director, long-term expatriate staff for 9 subject matter areas, as well as short-term expatriate staff in selected specialized areas (to be determined).

A number of expatriate staff candidates for Ibb/ATC have been identified in Egypt and Jordan (See Trip Report). During the July-August trip to Egypt and Jordan (Khaldi/Matteson Trip) these candidates and others were interviewed. As a result, the staffing for the first year at the Center looks promising. (For detailed evaluation of the possible candidates see Matteson Report).

C. YARG Inputs:

1. The By-laws which were proposed by the UNESCO Advisor for the MOE, will become, when approved by the Board of Agricultural Education, the basic document of government policy for Ibb/ATC.

The By-Laws contain details on objectives, curriculum, policy for students exams, requirements and incentives for student enrollment, school activities for regular and for outreach courses and programs, policies for regular and practical training, job description for Yemeni counterparts, administrators and staff as well as a description of their responsibilities to the Center and to the Ministry.

SECTION J

INDIVIDUAL TEAM MEMBER REPORT
TRIP REPORTS, REVIEW OF OUTPUT
AND
SUGGESTIONS
OF
JEAN R. KEARNS
MEMBER
TITLE XII DESIGN TEAM SOCIAL SCIENTIST
SANA, YEMEN

)
Memorandum

Re: Review of Output

From: Jean Kearns

The information which I prepared and submitted while part of the CID Title XII Design Team to Yemen was as follows:

- (1) Short social soundness analysis statement for inclusion in Ibb School Propos.
- (2) Detailed social soundness analysis for attachment as appendix to Ibb School Proposal (10 pages).
- (3) AID WID statement for Ibb School Proposal Appendix.
- (4) Statement relative to D. Ponasik list of questions about Ibb School for inclusion in Appendix of Ibb School Proposal.
- (5) Social soundness analysis for CID Title XII Program in Yemen Arab Republic (approximately 40 pages).
- (6) Routine reports relative to trips made outside of Sana into other parts of Yemen.
- (7) Proposal for satellite activity: Women in Development-Home Economics Learning Program (approximately 20 pages).
- (8) Memo to Ibb Team re social considerations when setting up the Ibb School.
- (9) Memorandum re trip report observations.
- (10) Memorandum re suggestions for inclusion of women in poultry project.
- (11) AID WID statement for Agricultural Water Resources Program appendix.
- (12) Input re beneficiaries and spread effects of PID for Agricultural Water Resources Project.

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Memo to: Ibb School Team

Re: Social Consideration

From: Jean Kearns

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The Design Team Leader, Don Heckerman, requested that I write this memo relating suggestions relative to social considerations in setting up the Ibb school. I will not elaborate on the points since the more lengthy Ibb school social analysis and the social soundness analysis for CID Title XII Program contain further details relative to these points.

- (1) A research component should be built into the overall design of the school. This component should be designed so as to ascertain ultimate impact of the school in the lives of the students and the parts of society in which those students are involved. A pre-test, post-test situation may be adapted to establish basic knowledge and acquired knowledge. Further research techniques should be built into the design so that information can be acquired on an on-going basis.
- (2) The Muslim way of life is central to the Yemeni. Careful consideration must be given to timing of events, activities, exams, etc. at the school so as not to interfere with fast periods, feast days, etc.
- (3) Family honor is very important to the Yemeni. Special care must be taken so as to protect the family honor of the students and faculty alike. Faculty must be made keenly aware of the need to respect Yemeni ways, culture and family system.
- (4) Time is fluid in Yemen. Non-Yemenis should not expect promptness. Always allow a time cushion for completion of projects, etc.
- (5) Spend time in planning. When planning a new activity or project spend as much time as possible setting up and "touching base" with political and religious leaders as it will "pay off" later in the project.
- (6) Social class exists and is important in the Yemenis' way of life. When designating room mates in the school dorms, it would be wise to have a Yemeni make the arrangements with students' social status as point of reference.

- (7) When hiring or appointing people to leadership positions, be careful to consider social class. An upper class person will not work for a lower class person. In addition, if a lower class person heads up a village project, the project may fail due to lack of cooperation because of leader's social status (or lack thereof).
- (8) The family is more important than the individual and since this is the existing situation, the leaders of the Ibb school should make efforts to involve the families and enlist their cooperation.
- (9) The school may need to consider seasonal scheduling so students can return to their homes to help during work peaks, such as planting and harvesting seasons.
- (10) Good health practices are almost non-existent in some households. Students should be oriented to dorm living with specific instructions relative to health and sanitation. Put a lot of garbage cans around to avoid litter on campus.
- (11) Use various means to recruit students. L.D.A.s, local leaders, school personnel may all be contacted for suggested list of students. Visit with students' families so as to get their cooperation.

I hope these suggestions help.

Memo to: CID XII Project

From: Jean Kearns

Re: Trip Report, July 16-20, 1979

July 16 - Traveled from Sana to Taiz. Observed general agricultural projects, visited Ibb school and noted especially the number of women working in the fields. Stopped at one town and in conversation with a shop keeper, he asked what the woman (me) was doing. He was told that I worked in agriculture. He said that was impossible because women do not know about agriculture. When told that I was not really in agriculture but was studying people, he seemed relieved.

July 17 - Visited British Agricultural Engineering Project and met Jim Williams, Director. Visited Yemeni Swedish Clinic and had lengthy conference with Dr. Ingemar Hermansson, chief of the project and Yemeni administrative director.

Observed well baby clinic.

Had lengthy conference with Saida Ali Ragch, midwife at Yemeni Swedish Clinic.

Observed clinic in suq (no English-speaking person there but they allowed me to observe examinations, etc.).

Had discussion with nurse of mobile vaccination team but was not able to get her name correctly.

July 18 - Had lengthy discussion with Hanne Tietze in Turbah.

Visited Turbah hospital.

Observed village suq in Turbah.

July 19 - Traveled from Taiz to Hudaydah.

Visited Hudaydah Hospital.

Visited and toured well baby-O.B. clinic. Met with Sister Louise.

Attended briefing session re health program A.I.D. is going into with C.R.S. in Hudaydah area.

July 20 - Traveled from Hudaydah to Sana.

Summary of information: In conversations with various personnel on this trip the proposed satellite project, MID HELP, was discussed in general terms. In all cases it met with enthusiasm. Helpful information relative to the proposed activity included the following:

(1) Choose an older woman as the village para-professional.

- (2) Classes held at the Yemeni Swedish Save the Children Clinic have been well received. The basic teaching method involves the women by encouraging them to share their experience.
- (3) Younger mothers seem to accept advice relative to their children readily and appear to want more lessons in nutrition and child care.
- (4) The Yemeni people, especially in the South, are clever and open minded and would relate to such a village project well.
- (5) The woman's position is not a strong one, but in recent years has been improving.
- (6) The best approach to help village people is through a village resident as this inspires trust and confidence.
- (7) Girls marry as early as eight years of age and these young people need help in several areas.
- (8) In villages a man may have two or three wives if he has plenty of land because he needs them to help farm the land.
- (9) Old people are valued in Yemeni society.
- (10) Most women do not sew. If they do sew, they can make money by sewing for others.
- (11) Menopause causes a lot of problems among the women.
- (12) The Aden influence in the southern part of Yemen shows itself in more education and more freedom for women. Radio programs and television broadcasts in that area come from Aden.

Memo to: CID XII Project

From: Jean Kearns

Re: Trip Report, July 27, 28, 29, 1979

July 27 - Traveled from Sana to Taiz. Observed general agricultural fields and visited Ibb school.

July 28 - Visited Dar Al Nasr, which is village on Sabr mountain. Observed patterns of women working, noted absence of men almost completely. The women were very direct, unveiled and walked with pride. There were lots of gold teeth and jewelry which they wore even while hauling water.

Had detailed visit with Mr. El Kheir Hag El Amin, project manager of SURDUP. Had discussion about SURDUP newly initiated Home Economics program.

July 29 - Traveled from Taiz to Sana. Visited with SURDUP specialist in charge of seedlings, etc. in Ibb.

Summary of information: In conversation with Mr. El Kheir, the proposed satellite project, WID HELP, was discussed in general terms. Helpful information relative to the proposed activity included the following points:

- (1) SURDUP realized that women are doing bulk of agricultural work and made the decision to begin training village women. Mr. El Kheir said that this fact is very evident to everyone on project and L.D.A.s also.
- (2) Men cannot teach women and the need for trained women is desperate in Yemen.
- (3) If USAID began such a proposed project, SURDUP would consider it strengthening and would like to join in a cooperative effort. Cooperation could be immediate in terms of technical aid for the leaders, exchange of visual aids and the development of instructional materials.
- (4) The para-professional at the village level is the way to help the village women.
- (5) Use L.D.A.s to institute and push the program. If you have one successful program, you will have many requests from L.D.A.s for additional programs. SURDUP has grown, in women's home economics training, from one center to 25.

MEMORANDUM

SUBJECT: Trip Report

FROM: Jean Kearns

This is a brief report of my activities and investigations during my temporary tour of duty in the Yemen Arab Republic during July, 1979.

One of the primary tasks assigned to me was the social soundness analysis assessment of the Title XII proposed project. The final draft of the analysis for the overall project and for the Ibb School satellite activity was filed prior to my departure from Yemen. The following are some observations which I submit for whatever purpose they may be used.

MINISTRY OBSERVATIONS...Every interview and document that I reviewed pointed to the shortage of trained personnel in the ministries. A memo by Manfred Wenner in February, 1979, discusses the Ministries of Agriculture, Education and Public Works. At that time (February, 1979) the percentage of illiterates on the staff ranged from a low of 16% in the Ministry of Education to a high of 22% in the Ministry of Agriculture.

The implications of such a situation are clear, that is that Project personnel will have to be extremely careful in seeking out and building effective working relationships at the ministry level. Time must be taken to develop a personal relationship as well as a professional one. Time taken for coffee and social conversations should be considered as necessary for the good of the Project.

Frankly, I suggest that the Team identify key ministry personnel and assign a logical team member to be the contact person for that ministry person. The designated team member should take the leadership role in all negotiations with the specific ministry. This contact work should be a permanent part of the duties of the individual team members.

RESEARCH NEEDS...One can identify very few, if any areas, in which additional research is not urgently needed. Decisions which must be made by the Core team will demand base line data, which in many instances, is not available. It is this writer's opinion that time taken gathering preliminary data will pay off in the final activity design. Acceptability and effectiveness will benefit from this type of approach. Some existing data

must be field checked for accuracy and updated. A country undergoing as rapid a change as Yemen requires more frequent update of research findings than a society which is less changing.

It appears that at this time the resources for agencies or institutions within the country to conduct research is limited. My observations of the ministry and of the University of Sana lead me to recommend that what data is required by the Project, unless otherwise available and accurate, must be undertaken by the Project personnel which may be TDYs or long term personnel.

SATELLITE ACTIVITIES... Each satellite activity should have as part of plan, a research component. In order to determine change or social impact a pre-assessment and post-assessment must be conducted. I would suggest that each satellite activity team select carefully any instruments which they choose to utilize so as to avoid cultural bias and other limiting factors.

LOCAL LEADERS... Spend time informing and gaining cooperation of leaders in both government and religion. Local leaders are powerful in terms of encouraging people to participate or leading the resistance to any activity. It would be wise for each activity team to identify formal and informal leadership roles in areas in which the activity will operate. Utilize informal interview and participant observer role to ascertain leadership patterns.

DAILY LIVING... Yemen is not the most comfortable place in the world to live. In order to make tours as productive as possible, the living arrangements must be carefully planned. In addition to identifying acceptable living quarters, attention must also be given to transportation and communication means.

An overall plan should be activated prior to personnel arriving in the country by the project director. Information, suggestions and instructions should be prepared in a written format for circulation to Core Team members as well as any other personnel who may travel to Yemen for any length of time.

Memo to: Poultry Project Team

Re: Role of Women in Poultry

From: Jean Kearns

It appears that in most of Yemen poultry raising and care is in the hands of women. This appears to be true of small flocks and this writer is not certain as to the status of large flocks.

In the Women's Poultry Survey conducted by Judith A. Obermeyer for the American Save the Children program, several items of interest emerged. The total sample of 66 women had all had chickens in the past six months and 40 were currently raising chickens. The women use the poultry and eggs in their homes and sell from house to house as well. Women who have egg producers indicate that 50% of the eggs were consumed by the family, 30% were sold and 20% were given away. The economic benefits range from 10 to 15 YR weekly and sometimes in excess of 60 YR monthly.

The major problem in egg production reported by the women was sickness. The typical pattern is for the disease to spread from house to house. Since chickens scavenge in the street, the spread of the disease will probably result in a 100% loss of village chickens.

Obermeyer concluded that the egg industry in Mahweit offers much potential for women's economic activity and should be viewed as an important resource for development.

Based on the above study as well as observations and discussions with village women it is my suggestion that the poultry project be planned so as to incorporate women. Several methods may be adapted so as to achieve this. The following are presented for the consideration of the Poultry Project Team.

- (1) Employ a female poultry specialist who can conduct poultry classes for women at the poultry farm. (This is probably the weakest suggestion because of difficulty of getting women to leave the village for classes).
- (2) Coordinate the activities of the Poultry Project with the proposed satellite activity, WID-HELP, and train regional professionals who will in turn, train village para-professionals. This may or may not require the Project to employ a female poultry specialist. It would require special planning for short courses, in-service training and field supervision.

- (2) It may be possible to train husband/wife teams from the villages in poultry care and production. In this type of arrangement, this writer suggests that the Project employ both male and female teachers. Classes would probably have to be segregated along sex lines. Careful planning as to housing would be necessary. In addition, child care would have to be provided.

The results of this plan may be very positive with each couple returning to their home village prepared to help the village people. The woman would teach the women and the man would teach the men.

- (4) Combine number (2) and (3) in such a way as to supplement the WID-HELP activity by training village and/or district specialists in poultry care and raising.

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SECTION K
INDIVIDUAL TEAM MEMBER REPORT

TRIP REPORT TO TIHAMA
AND TAIZ

Eugene P. Foerster
Texas Tech University
Lubbock, Texas

Trip Report to Tihama

Wed. July 4th, 1979

Left for Hodeidah at 1:00 p.m. No problems with transportation. Observed numerous terrace systems in mountains enroute. Farmers pumping water from wells in wadi bed. Farmers using donkeys and oxen with traditional plow to till field.

Many fields planted in maize. Planted fields showed signs of non-uniform soil depth and uneven distribution of water.

The upper side and ends of the terraced plots showed higher field elevation than that near the middle of the field and toward the terraces.

Other crops being grown were qat, alfalfa, banana, papaya, and flowers (cadi).

After leaving the mountains the temperature change was quite noticeable.

The Tihama soils are unstable. A considerable amount of soil was moving with the strong winds. In some areas the dunes were encroaching upon the roadway.

Some "oases" existed along the way where a well was being used for irrigation.

Arrived at Hodeidah 6:00 p.m. Check into Borj Hotel.

Thursday July 5th

Visited with the director of Agriculture Ali El-Zoom, director of UNDP, Prayag D. Tewari, and the manager of the Cumeish Farm, Abdulrahman Bamatraff.

Visited the North Cumeish farm where tree seedlings are being grown. Seedlings are being produced for various fruits and an acacia seedling is being produced for wind breaks. (The director could not recall the name of the acacia.)

Friday July 6th

Visited the city of Bayt Al Fakih and the market (souk) with the guidance of Dr. Abdallah Gaaya and Nasr Al Deen Fohaiem. Many agricultural products available in the market but most of them are imported. We then visited the Laiviyah Agricultural Co-op. Here okra and peppers are being grown for local market and for export to Saudi. This project has been quite successful.

We next went to Derihemia where the date co-op is. There are some half million trees now with more being put in. They have 5 varieties in production.

Taking a coast road back to Hodeidah we passed an area where sea water is being evaporated. The minerals are being collected. I understand this is principally for salt recovery.

Sat. July 7th

After waiting for over an hour for our guide--Bamatroff--we toured the South Gumeish farm. Here 14 wells spaced 200 meters apart are being used to irrigate the farm. All wells are connected to a main line and 5 lateral lines run across the farm. Each lateral has 10 openings. Water is conveyed to each plot by means of pipes and ditches. Excessive soil erosion was noticed at various discharge points in the plots. We then traveled to Wadi Rima and traveled its length to the first diversion dam. The main canal is some 40 km long. Excessive erosion was noted in the plots and in the distribution canal. In many places the canal is on the verge of being washed out. The field plots surfaces were very uneven. Some fields had been irrigated with dry spots still evident. Other fields along the way had at least 50 cm of water in them--youngsters playing in the water were waist deep. The soils looked good and should have a good water retaining capacity. Infiltration may be a problem due to surface sealing. Better control of the wadi water could be obtained with a permanent diversion structure. Water distribution to the fields is from one field to the next. A better distribution system would help distribute water more evenly from one field to the next. Leveling the fields would improve distribution within the field and allow for less depth of water to be needed to get sufficient water to all parts of the field.

Some water measuring devices were noted in the main canal.

There generally are several diversion dams in each wadi. In Rima the total flow was being taken by the first canal at the time of the visit. We stopped at Al Jarubah and looked at the hort. station. Here avocado, banana, citrus, papaya, mango, guava and passion fruit trees were being grown. The well there is capable of supplying the total need in 2 hours or less per day.

Sunday July 8th

Again we waited for more than an hour for Pamatroff to be ready to go. This time we went to Zabid and visited with the TDA director Ahmen Ali Hamed. A Mr. Saleem heads the hydrology section. At present the information is being assembled and catalogued. We went up to the diversion in the wadi Zabid just up stream from the TDA headquarters. Here a permanent structure had been built. Water was being taken off on both sides of the stream. The stream was carrying several times the amount of water that Rima was the day before. Water was being passed down stream together with the water for the two diversions at this point. The same problems exist here as they did in the fields of the wadi Rima. The sediment load of the stream was very heavy. The director indicated that space would be available at this location for people to work in the area of on farm water management. The administrative unit of TDA is to move to Hodeidah.

The thought occurred to me--why not dam the wadi up and extent the use of water over a larger period of time? However, the expense of such an operation would be great as compared to the benefits. Also, the heavy sediment carried by the stream would significantly shorten the life of any dam built.

Monday July 9th

Met in UNDP office with Prayag D. Tewari, Ray Fort, Charles Uphaus, Rafika Saad, and others. Discussed various things about the Tihama and other programs. Was not able to make it to Wadi Surdud.

Tuesday July 10th

Left Hodeidah at 8:00 a.m. and arrived Sana at 1:00 p.m.

Observed field cultivation being done by large field tractor, oxen, donkey and camel power. Oxen and donkeys were used singly and in pairs.

Trip Report to Taiz

Monday July 16th 1979

Left Sana at 11:00 a.m.; arrived at Taiz at 6:00 p.m.

Agriculture activity was minimal after leaving Sana. After going over the 1st pass--Yislah Pass--agricultural activity increased with some irrigation taking place. Maize, sorghum, alfalfa, peas planted in the sorghum and some vegetable farming was observed. The soils of the valley showed severe erosion. Near the mountains deep gullies occur and the top soil is gone, leaving very stoney exposed fields.

At Ibi everything was very green with good crops of sorghum and maize in the fields. Saw some coffee and was told that potatoes are grown in the area also. Rainfall for the area is about a month late but generally averages about 1000 mm per year. We stopped at the school and it looks as though it will not be ready for occupancy in September.

Tuesday July 17th

Visited with Jim Williams of the Yemen-British Agricultural Engineering Project. Project consists of field evaluation of equipment, farmer extension, and demonstration and package deals to farmers.

They found that 30-40 hp tractor seems to be best suited to plots and tillage requirements for dry land areas. For tillage a two (2) disk reversible plow and a nine to eleven (11) tine, spring trip, cultivator with seeder attachment is all that is recommended. In the Tihama area up to a 60hp tractor maybe needed, particularly if moldboard plows are used. Rotavators and disk harrows not recommended for either area.

For harvesting a stationary thresher has been found to work well on sorghum. However, it does not clean the grain--it just separates it from the head. Another one that threshes and cleans was found and does a creditable job on most threshing requirements. Both use the rasp bar cylinder for threshing.

A training program is conducted with 10-15 people participating per year. This is a full time 36 week program. Introductory level agricultural engineering is taught. People are qualified to work with agricultural agencies as field extension advisors. Also, maintenance and minor repair of equipment can be handled by these graduates. A formal extension program

is conducted by the Yemen/British Agricultural Engineering Project. They contacted 250 farmers last year in local training sessions. These sessions teach the farmers who have tractors how to maintain them and do minor adjustments. The Project provides information to the GOY and the credit bank on importation.

Also, visited with Dr. Faud of the Central Research Station. He was very friendly and helpful. Expressed the need for range management, watershed management and water management in Yemen.

Wednesday July 18th

Went to Turbah. Area is drier than Taiz. Mountains are very barren and range is in poor condition. Valley areas are producing the typical products of sorghum, dates, mangos, banana etc. One product not noticed elsewhere was the production of honey. There were several locations with over 100 hives each.

Domestic water supply systems are being utilized in most of the villages. More so than in any other area I have been. These consist of a well-pump-pipe system connected to an elevated reservoir (large tank on hill) and feeder-supply lines to various locations.

Thursday July 19th

Left Taiz at six, arrived in Hodeidah at 10:30 a.m.

Met with director of UNDP, Dr. Tewari. Had a discussion of re-forestation, sand dune control and water management. He expressed an interest in obtaining any plants available for sand dune control.

The possibility of using vegetation to slow down salt water movement was discussed. Several shallow rooted plants were mentioned such as salt cedar. No deeper rooted salt tolerant plants were suggested.

Friday July 20th

Left Hodeidah at 8:00 and arrived Sana at 1:00 p.m. Some areas between Sana-Hodeidah are still in dire need of precipitation.

Miscellaneous Notes

Rained each afternoon in Taiz. Rains are preceded by very strong winds. Wind damage to tall crops is very likely. Some wind damage to sorghum was noted in the Ibb area. Damage to sheet metal roofs is common.

Ground water in the mountain plain between Yisbah and Sumavah Passes is of good quality except for some isolated spots. The depth to ground water is from just a few meters to 65 or more meters. The depth of the aquifer is similar. From a few meters to some 200 meters. One well in the mountain plain was drilled to 250 meters and did not bottom on to a confining depth. The depth to water was 65 meters in this well. Mr. Williams of the Yemen/ British Agricultural Engineering Project stated that he thought the aquifer was already being over utilized by tube well irrigation.

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Agricultural Area

The agriculture area consists of the Tihama, Mountain Plains, Upland slopes and the Eastern slopes of Yemen. This area comprises some 1,515,000 hectares according to the World Bank Report. Of this, 1,285,000 hectares is rainfed agriculture or approximately eighty five (85) percent. The Tihama consists of 235,000 hectares with 130,000 hectares under some form of irrigation. This is just over fifty-five (55) percent of the Tihama area. The irrigated area of the Tihama is more than fifty six (56) percent of the total irrigated area of the country.

The Lowland Farm Development Project Report (LFDPR) indicates that the aquifer of the Tihama is capable of supplying water for 30,000 hectares on a sustained basis. Conversations with various individuals indicate that the aquifer is being depleted, as wells in the area have had to be deepened in many instances. The decline appears to be approximately one (1) meter per year. This would indicate that more than 30,000 hectares are being tube well irrigated at this time.

Mr. Barratroff of the Gumeisha Farm indicated that there are some 2,000,000 hectares of marginal land in the Tihama. This is land that is planted in millet when rainfall permits. He indicated that this production is successful about once (1) in three (3) years. The practice is to plant millet after a rain without any soil preparation or clearing of fields. This is done on sand dunes as well as more suitable soils. The practice of not clearing the area should be beneficial in that available ground cover is not destroyed. If the millet roots were not removed after harvest, they would provide some soil erosion protection also.

Irrigation Water in Tihama

The source of irrigation water in the Tihama is from tube wells and the runoff waters in the various wadis. The Lowland Farm Development Project Report (LFDP) estimated that some 2,000 million cubic meters of water occurs as runoff to the Tihama region. If one hundred (percent) efficiency were possible 200,000 hectares could be irrigated. A considerable amount of the runoff percolates into the aquifer and is possibly used as tube well irrigation. The study reported that 60 to 134 million cubic meters of water reaches the aquifer. Depending upon depth of irrigation

water required, it would be possible to irrigate up to 30,000 hectares from tube wells. This implies no depletion of the aquifer. The World Bank reports that this much area is being irrigated from tube wells and the water table is declining.

The use of wadi water is called "spate" irrigation. These two systems of irrigation present two very related but distinct problems. Both require management for the most economic use. However, the management problems are very different. Tube well water from the underlying aquifer differ in quality from that of the wadi water. The Lowland Farm Development Project Report indicates that there is a salt problem inherent in the use of this water. It reported no problem exists with use of wadi water for irrigation. This is evidenced by the fact that farmers have used these waters for centuries without any such problems.

The management of wadi water is basically that of control. The depth of water applied and the level of the field for even distribution is the key to more economic use of wadi water. Also, distribution of water to the various fields is primary to water management.

The management of tube well water is basically control also. However, with the quality of water being a problem, different control parameters exist. One must control the water balance in the soil to prevent salinization and alkalization of the soil. Over irrigation, beyond the specific plant needs, is important to control salt levels in the soil. Flushing the fields with wadi water every few years would help to control salt buildup. This may be possible when permanent diversions are installed and excess water is available, beyond the needs of the normally irrigated wadi areas.

Irrigation Systems

Water quality is a problem with tube well water. The quality decreases with distance from the source to the Tihama. In other words, in the lower reaches of the wadi as it reaches the coast, and as distance from the wadi increases perpendicular to the wadi.

Alternate methods of irrigation would increase the water utilization. Furrow irrigation could be used in both tube well and spate irrigation schemes. Trickle irrigation would seem to be a possible solution to water control and salt problems from tube wells. A simple trickle irrigation

system can be made using one-half inch tubing and six (6) to twelve (12) inches of spaghetti tubing for orifices. The depth to the water table under the Tihama area varies with distance from the coast. It is very near the surface near the coast and reaches depths of 45-50 meters or more near the mountains. The thickness of the aquifer is approximately forty five (45) to some one hundred (100) meters thick. Well yields as given by Mann are thirty six cubic meters/ha for shallow wells (10-20 meters deep) and eight (80) cubic meters/hr for deep wells (75 to 150 meters deep). In many cases the wells do not penetrate the entire aquifer. A hand dug well will only penetrate the aquifer a few meters--as little as three (3) meters. Therefore, the full potential of the well is not achieved. However, this benefits the sustained yield concept of water production in that less water is obtained from these wells.

Wells that do not penetrate the entire aquifer will continually fluctuate in yield. This makes it very difficult to design an irrigation system that will operate efficiently and steadily from year to year. A lower water use system would be suggested for such conditions. It would be to the farmer's benefit, lower operating cost, to use a lower water demand system if irrigation rather than the traditional flood system now in use. The small fields, high winds, and high evaporation rates suggest that a sprinkler system would not be the most appropriate method of irrigation in the Tihama.

Irrigation Power Units

The power units used to pump water is generally a Japanese manufactured diesel engine of thirteen (13) to thirty two (32) horsepower. These units are connected to a vertical shaft turbine pump by a flat belt. For very shallow wells, a centrifugal unit is used which is directly connected to its power source. The pump is usually placed at the surface. In some cases it is placed in a depression. Along the upper reaches of the wadis wells are constructed in the wadi bed. In the Tihama wells are located throughout the area.

The World Bank Report indicates that some fifty-thousand (50,000) pumps have been imported into Yemen. No breakdown is given as to location of these pumps throughout the country.

The Montane Plains and Wadi Fima Project Report 12, estimates the life of a centrifugal pump unit at two (2) years. The larger diesel-turbine pump units are expected to last five years. Therefore, some of the recent imports would be replacement units.

The pumping units normally operate at reduced capacity. The farmer finds that he has more water than one can handle at any one time, so the power unit is operated at reduced speed. This makes for a more inefficient operation. Not only is the power unit operating below designed speed but the pump also. Pumps are designed for very specific operation. This includes head and capacity performance and unless the pump characteristic efficiency curve is a flat curve, the pump is operating inefficiently. However, the reduced operating speed will lengthen the life of both units.

The depth to ground water varies greatly. In the Tihama the ground water is near the surface along the coast and is 45-50 meters deep further inland. The Montane Plains Wadi Rima Project Report (MPWRP) indicates that as great or greater a variation in the mountain plain areas--up to 65 meters in depth. This variation in depth suggests different pumping units for the pumping of irrigation water. The horsepower requirement is directly related to the height that water has to be lifted. Therefore, the height to which water is raised determines the economical limit of irrigating from tube wells. The MPWRP report indicated that approximately 65 meters is the economic limit.

Water Related Research

Some water related research has been undertaken by the Tihama Development Authority (TDA). It appears to be rather limited in scope but is crop related rather than a laboratory analysis of water quality as reported by other Tihama related reports. A listing of these studies follows.

Cotton related studies:

1. Flat basin vs. furrow/ridge irrigation as they influence cotton yield and fertilizer response.
2. Cotton water requirements and irrigation intervals as they influence fertilizer response and yield.

Sorghum related studies:

1. Irrigation method and nitrogen level as they reflect on sorghum grain yield.

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2. Effect of irrigation intervals and total irrigation water applied per season on grain and stover production in sorghum.

Maize related:

1. Effect of irrigation method on maize grain production.

For cotton under controlled conditions basin and furrow irrigation systems are comparable in yield results. However, furrow irrigation offers an economic advantage in that less water is needed to obtain favorable yields. Sorghum yields were slightly higher under controlled basin irrigation than that for furrow. It does not follow that these same results would apply to farmers fields under less controlled conditions. Over and under irrigation in a single field is common. Furrow irrigation for lengths of furrows that are possible in present fields would overcome uneven irrigation and over irrigation practices.

Maize production was increased in every trial by furrow methods of irrigation. All other factors were the same except for maize varieties. Each variety yield was greater under furrow conditions. No greater in depth research relating to irrigation aspects of plant needs and use was found. Plant differences together with climatological and soil differences in Yemen would suggest a need for such research. This would be particularly true for adaptive use of plants in Yemen as well as developed varieties which could be forthcoming.

Water Policy

Water rights to wadi water is based on Islamic law. However, this basic structure has been amended by local custom and practice. For instance, in Wadi Bina, according to the Wadi Bina Project Report, the rights of traditional first users are given precedence over those of new comers. These rights have been established after challenges in courts and settled by means of adjudicators. The water rights as established have come about by continuous change, but yet, recognition of historical and former rights do exist.

Historically, the first water users settled in the mid-reaches of the wadi. Here, water was more easily obtained from the wadi as the wadi bed was not as deep as in the upper reaches steeper slopes dominate the topography. Even though new canals, even upstream, were built and

existing canals extended, the original irrigators held their rights to water and all new comers had to be content with only surplus waters. As the supply of water became inadequate, other restrictions came into being. These restrictions took the form of limitations on area to be irrigated or on a time period allocation for water distribution.

The courts in these water rights disputes do not have enforcement powers. The implementation of decisions taken is left up to the parties in the dispute. A document dated in 1931 gives one party the right to enforce a court decision by breaking the canal of the other party.

The institution of wadi water rights has long term historical precedent. Any charges would have to come about through this same system of agreement. However, tube well irrigation is of recent origin and any water rights in this area are not defined as yet. Tube well irrigation is developing at a rapid pace. The World Bank report indicates that nearly 50,000 pumps have been imported into Yemen. With the advent of the rapid development of tube well irrigation, water tables will decline. In the case of those wells in close proximity of the coast, salt water intrusion will occur. In the case of those wells further interior, increased pumping costs and deepening of wells will be the result until it is no longer feasible to irrigate--economically--or the aquifer will not support irrigation from wells. Unless some regulation is imposed upon tube well development and pumping the foregoing statement will certainly bear true.

Results of the aquifer model will provide the necessary information for advice as to safe yield from the aquifer. This will include such things as well yield capability, well density requirements, water quality, irrigation needs, salt leaching requirements, aquifer recharge, and aquifer decline.

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SECTION L
INDIVIDUAL TEAM MEMBER REPORT

Upland Watershed Renovation
through an
Integrated System of Forest, Range, and Livestock Management
for

Yemen Arab Republic

Supplement to
A Proposal for Improved Water
Management in Yemeni Wadis

by

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Table of Contents

	<u>Page</u>
List of People Interviewed	1
Conclusions and Recommendations	11
Introduction	1
Existing Conditions	
Physical and Biological Features	3
Range Management Knowledge and Practices	9
Range Livestock Management	11
Range Management Education and Extension	16
Range Management Research	17
Brief Description of Other Existing and Proposed Assistance Efforts	
Livestock Credit and Processing Project	19
USAID Title XII Ibb School	19
German Government and European Economic Community	19
Montane Plains and Wadi Rima Project	19
Range Restoration, Reafforestation and Pasture Improvement Project	20
Directorate of Forestry, MOA	20
Central Research Project	20
Southern Uplands Rural Development Project (SURDP)	20
Rada Integrated Rural Development Project	21
Bibliography	22
Appendix	23
Trip Reports	24

List of Tables

Number	<u>Page</u>
1. Forest and Range Plant Species found in Montane Plains of YAR	6
2. 1975 Estimated Livestock Numbers, YAR	11
3. Average Price of Mutton in YAR, 1966-77 and 1979	12
4. Characteristics of Selected Sheep Breeds	13

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Conclusions and Recommendations

At the present time Yemen agricultural production is largely operating on a subsistence basis. Apparently the only major exception is found in the pump irrigation areas at the mouths of the wadis in the Tihama. This area offers the best economic opportunity for future development of large scale commercial farming, capable of sustaining the rapidly increasing population, and providing commodities for export.

Such a profitable development in the Tihama is completely dependent for success on the continued delivery of usable irrigation water from the wadi watersheds in the mountains above. A large proportion of the area within these watersheds has been terraced over past millenia at the expense of millions of man-days of labor. Diversion of water from stream channels onto crops grown on these terraces is important to downstream users because it puts the run-off into the soil mantle and prevents uncontrolled floods from carrying the soil and water destructively down the channel and out to sea.

Examination of these watersheds shows them to be in a rapidly deteriorating condition. The protective forest cover, formerly the natural vegetation on much of the area of these mountains, has been removed over past centuries and used for fuel and construction. Range vegetation is seriously depleted by past and present overuse, and productivity for present grazing and erosion control restricted by overland loss of vital water supplies. Natural revegetation through non-use does not appear to be a viable alternative.

The presence of deepening gullies on watershed rangelands and deteriorating terrace walls is stark evidence of the need for immediate restorative action. Failure to recognize the emergency nature of this situation and subsequent delay of the initiation of necessary programs would mean the inevitable destruction of the land by the desertification syndrome, so evident in the histories of civilizations of the past (1).

It is recommended that a program of watershed restoration be initiated in connection with the water management program planned for the Tihama. Through an integrated system of forest, range, and livestock

management and installation of erosion control structures, a valuable demonstration of water management in upland watersheds can be provided. Watershed restoration will require attention to the entire system to be successful, and success will depend on the informed cooperation of involved village farmers. Their major interest in the rangeland portion of their holdings is for livestock and fuel production. Thus the strategy will be to offer increased forage and fuel, while accomplishing soil stabilization through plantings of grasses, shrubs, and trees. It will further be necessary to teach villagers the art and science of forest and range management to insure permanence of the improvements. Several donors have already contributed watershed renovation programs, and their cooperation is essential.

The initial demonstration will cover a five year term, with the possibility of a five year extension if success justifies it. The plan includes renovating about 120 hectares of range and abandoned terraces with improved plant species and treating steep ungrazable areas with erosion control structures, plantings, and complete grazing protection. The size is purposefully being kept small to allow adaptation of principles developed elsewhere to Yemeni watershed conditions. The plan includes on-the-job training and out-country education for 8 Yemeni nationals.

The project will be located in an area with relatively easy highway access for purposes of bringing in workers, supplies, and, later, field day visitors. Once success is apparent, projects in other areas may be started following the pattern developed at the original site. Eventually, it is envisioned that the program will be extended to all needful areas as funds and trained manpower become available.

The site for the demonstration will be carefully selected to have the best possible conditions for rapid success. It should be in a relatively high precipitation area, and located on fairly gently sloping range land accessible to power equipment. The land should be under the control of a fully cooperative Village Development Association, where access to land and other facilities will be forthcoming as needed, and farmers will be amenable to learning and applying the new management practices required for long-term maintenance of the treated area.

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Introduction

In many respects, social and agricultural conditions found throughout middle eastern and North African Arab nations are common to YAR. With rapidly increasing population, the need for expanded food production has become critical. An important source of quality protein for proper human nutrition has traditionally been produced by local flocks and herds, grazing semi-arid ranges and forest. But newly introduced political, social, economic, and biological changes have developed severe dislocations in traditional balances and now threaten to destroy the fragile wildland resource. People in the cities, including government officials, are aware of the increasing cost of meat, but even the farmers themselves do not fully appreciate the severe and irreversible changes taking place under their very feet. Overgrazing and excessive forest cutting threaten to trigger the "unravelling" of the entire ecosystem upon which the YAR society is founded.

Much of the current need for increased food has been satisfied by massive importations of foodstuffs from countries having excess production. In return, YAR has emigrated large numbers of workers to oil-rich neighbors and received substantial foreign aid grants and loans to assist in balancing international trade.

However, in the long term, YAR will undoubtedly find it necessary to greatly increase food production at home. It is questionable that emigration and resulting remittances can continue indefinitely at the present

rate. Oil reserves in the Arab nations now supporting Yemeni emigrants are not inexhaustible. And Yemen has no other immediately exportable commodities to replace remittances and foreign aid grants. It is estimated that 64% of the resident population is directly involved in agricultural production. Population is estimated to be increasing at a rate of 2 to 3% per year, which normally leads to a doubling in 25 to 30 years. Thus, agricultural production must inevitably be increased if the country is to survive even at its present low standard of living.

In this semi-arid region, water and soil are critical to food production. Well managed watersheds provide water with at least four desirable characteristics: optimum quantity to fill society's needs, of potable quality, delivered dependably during the dry season when most needed, and free from destructive floods. Yemeni people can ill afford to allow the soil to be washed from mountainous watersheds, causing untold damage to upstream as well as downstream improvements.

This generation is the beneficiary of a great heritage from the past in the form of laboriously constructed terraces. The happiness and quality of future life in "Arabia Felix" depends on maintenance of these terraces, and they in turn depend on the restoration of the wild grazing lands and forests in the headwaters to something approaching their original condition. If this can be accomplished, eventually ancient springs will flow again, the skys will be bright and free of dust, children will play in the shade of the forests, livestock will rest, satisfied from their grazing before the day is done, and farmers along wadi channels will sleep in peace, free from the worries of devastating floods.

Prospects for achieving the benefits of proper wildland management appear to be good. Yemeni people are highly intelligent and adaptable to changing ways. They have literally come from the 15th century in less than two decades to cars, tractors, tape recorders, and T.V. They are strongly oriented toward profit-making ventures, and if given proper leadership and education, should quickly adopt conservation measures. Further, there are many other donor countries capable of providing useful contributions toward necessary research and application.

USAID, at the request of YARG Ministry of Agriculture, is preparing a program of water management for the wadi-type agriculture showing promise of rapid commercial development in the west facing mountain and Tihama area along the Red Sea. The proposal being presented here represents the upland watershed portion of the overall water management project.

It should be recognized, however, that experienced professionals from outside YAR cannot solve YAR problems by themselves, particularly problems requiring coordination of people, resources, and infrastructure. While basic scientific principles are true in any situation their application for the solution of local problems must depend primarily on the skill and knowledge of indigenous officials and technicians. Expatriates go home, but natives have to live with their problems. Recommendations and conclusions in this paper are given in that context.

Existing Conditions

Physical and Biological Features

YAR is located in the southwest corner of the Arabian Peninsula, bounded on the north and east by Saudi Arabia, on the south by the Peoples Democratic Republic of Yemen, and on the west by the Red Sea. Boundaries along the east side in common with Saudi Arabia are undemarcated. The country is traversed by a high range of mountains from north to south, with lowlands along the Red Sea in the west, as well as in the east along the central desert. The areal extent cannot be definitely determined due to the undemarcated boundary on the east, but is variously estimated at from 120,000 to 190,000 square kilometers. The Swiss Technical Team estimated the area to be 132,000 square kilometers, based on the 1975 aerial survey (13). This is approximately the size of the state of Washington, the smallest of the western range states in U.S.A. Cultivated land comprises 1,983,100 hectares, or approximately 15 percent of the total land area.

Large areas of the country are inaccessible to travelers due to

the unsettled condition of local tribes. As a result the observations noted in this account do not include first-hand observations of conditions in the northern and eastern governorates.

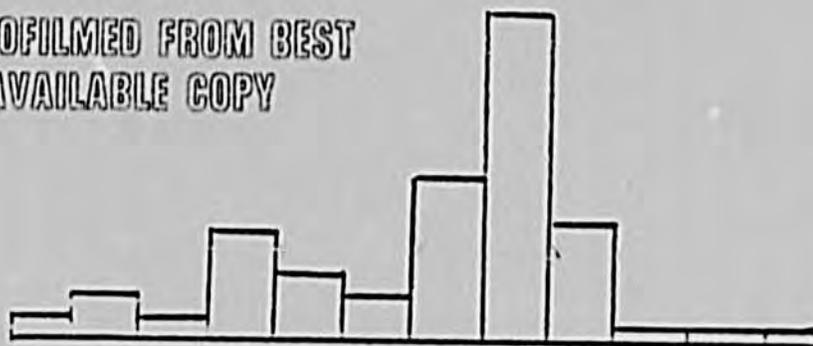
Surface geological zones in Yemen, adapted from the Swiss Technical Cooperation Service Final Report (13, page I-5) are as follows:

- A. The central part of the country, extending from Sana southward to the Taiz and westward to the foothills of the Tihama, consists mainly of the Yemen volcanics.
- B. From Amran northward to the region of Sadah the Jurassic and Cretaceous Series of sediments (Tawilah, Amran, and Kulan series: sandstones, limestones, marles, shales, and conglomeritic layers) form extended plateaus which reach eastwards to the Jawf valley (Jabal As-Har) and southeastward even to the region of Ma'rib.
- C. The northeastern highlands (Barat, Kitaf) mainly consist of massives of extremely weathered granites and gneisses of the precambrian age. The Precambrian basement also covers extended regions in the SE of the country (Khawlan-Al Bayda) and in the central part of Yemen (surroundings of Hajjah). Moreover the Precambrian basement outcrops at the scarps of several faultblocks where it underlays the Yemen volcanics and mesozoic sediments.
- D. Quaternary alluvial and aeolian deposits cover the coastal plain in the west (Tihama) and the extended depressions in the east (Wadi Jawf, Rub al Khali). Also the plains of the Central Highlands are covered with Quaternary "loess-like" deposits (Plains of Sana, Dhamar, Yarim, Rida, Taiz, etc.)."

Climate, vegetation, and topography are closely related. YAR is located relatively near the equator in the northern hemisphere, between 13° and 17°30', north latitude. The climate at low altitudes on the west coast and east desert is classed as tropical to sub-tropical, and in the highlands as temperate, with mild frosts occurring in winter. Precipitation is bimodal in the mountains with a "mini-wet" in March-April (Mediterranean influence) and a monsoon effect or "maxi-wet" from July to September. Typical of semi-arid regions in other parts of the world, precipitation varies greatly from year to year, with average

precipitation being an unusual occurrence. Evaporation exceeds precipitation by 2 to 10 or more times, but insolation is reduced markedly by frequent dust storms arising from fallow fields and barren rangeland. Few climatological records have been kept, and those that are available are of very short term (1-3 years) and often fragmentary.

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Bimodal precipitation model typical of
Upland areas in Yemen

The heaviest precipitation on record occurs at Ibb, in the southern uplands. It is possible to raise rain-fed potatoes and sugar beets with the approximately 1000 mm rainfall which occurs there. Precipitation amounts decrease clineally northward in the central and northern highlands to about 350 mm annually. The Tihama and east deserts receive from 0 to 200 mm annually, and most crops must be irrigated. More than one crop can be grown annually if irrigation water is available.

Rangeland vegetations throughout YAR has presumably been reduced to the present sparse cover of grazing resistant, decumbent grasses, thorny shrubs, and widely scattered dwarf trees by centuries of over-grazing and fuel gathering. The most luxuriant growth of range plants was noted in the mountains surrounding Ibb. Mats of rhizomatous grasses less than a centimeter tall, and apparently worthless shrubs, provide a relatively dense ground cover. At the other extreme, very little vegetation of any kind is found on the sandy soils of the deserts in the Tihama.

Strangely, annual plants appear to be rare, except in the western foothills along the edge of the Tihama. The range vegetation species list is in Table 1.

Table 1

Forest and Range Plant species found in Montane Plains of YAR

Trees

Acacia spp.
 Eiziphus spinachristi
 Tamarix spp.
 Eucalyptus spp.
 Euphorbia arborescens
 Opuntia spp.

Rangeland Trees

Acacia etbaica, A. Iragensis
 A. negrii, A. orfota

Grasses

Andropogon distachyos
 Andropogon greenwayi
 Aristida adscensionis
 A. congesta
 Eragrostis papposa
 Sporobitis africans
 Stipagrostis obtusa
 Tetrapogon villosus
 Cenchrus ciliaris
 Chloris pycnothrix
 Chrysopogon plumulosus
 Digitaria nodosa
 Hyparrhenia hirta
 Pennisetum thunbergii
 Sporobelus spicatus
 Themeda triandra
 Tragus racemosa

Meadows

Cynodon dactylon
 Dicanthium annulatum
 Echinochloa colona
 Eleusine spp.
 Pennisetum villosom

Shrubs and herbs Common

Acanthus arboreus
 Aerva spp.
 Aloe spp.
 Campanula spp.
 Commicarpus spp.
 Dianthus pumulis
 Eeriops arabica
 Euphorbia spp.
 Fagonia indica
 Felicia abyssinica
 Comphocarpus sinaicus
 Indigo Fera arabica
 Indigo Fera insularis
 Kleinia spp.
 Lavendula spp.
 Peganum harmala
 Pillicaria spp.
 Pollichia campestris
 Rumex nervosus
 Salvia spp.
 Stachys bizensis
 Stachys palaestina
 Thymus muslii
 Thymus serpyllum
 Vernifrux abyssinica

Adapted from "Montane Plains and Wadi Rima Project: A Land and Water Resources Survey" Vol. 1, p. 78, Ministry of Overseas Development, 1978

Table 1 is adapted from Acres (1, p. 78). These are assumed to be the plant species presently providing livestock forage on wildland grazing grounds. No information has been found regarding ecological significance, palatability, nutritive value, or productivity of these plants. Overall basal ground cover of grasses on representative sites under montane conditions has been estimated at 5 to 17%, and for herb and shrub cover 1 to 6 percent (1, p. 77). Grasses and herbs flower only rarely under the usual heavy grazing practices.

Range condition is judged to be "poor" to barren, but this judgement is without a foundation of ecological knowledge. Detailed ecological classifications as known in America and western Europe have not been noted in any of the literature, and presumably are non-existent. In the present retrogressive seral condition of the vegetation, accurate classification would be extremely difficult, if not impossible. No reflect areas have been observed on this tour, though it must be admitted that travel has not been aimed at finding such evidence.

Forests were apparently widespread and common throughout the mountains in centuries past. Old mosques have been noted to have large tree trunks as roof timbers, and some large stumps have been reported (3). Hansen (about 1670) described "Arabia Felix" as being heavily forested in the mountains, and specifically referred to a forest visited about 10 km south of Sana (oral communication from Erik Halberg). There is no such forest present today, and in fact, none in all of YAR. Fire wood is used exclusively for heating community ovens, and is very expensive. Certain tribesmen in the foothills cut acacia trees and bring them to the highway by camel or donkey. Wood haulers purchase the wood from the gatherers and haul it in pickups to the upland villages and cities. A pickup load of wood is reported to be worth about YR 4,500 or \$1,000. Cutting of fuel wood is proceeding much more rapidly than growth. Afforestation efforts cannot succeed until an acceptable alternative to wood fuel is found.

Range soils observed so far appear to have been eroded to the "C" horizon (parent material). Exposed surfaces are protected by a covering of stones in the form of a desert pavement. They appear to be very low in organic matter content and low in water holding capacity. Texture

of the upland soils examined falls in the fine sandy loam category, and in the Tihama are sandy. They probably are low in fertility and would be expected to be deficient in nitrogen as well as phosphates. Water infiltration rate is probably very low, and evidence of overland runoff abundant in the form of sheet erosion on hillsides and gully erosion in drainageways.

Soil from off range land appears to have been washed down hill by rapid overland flow of rainwater, and trapped behind adjacent stone or earthen terrace walls. These terraces rise a thousand meters and more from wadi bottoms and ascend in numberless concourses on hillsides up to 70 percent slope, in the most fantastic display of centuries of hand labor imaginable. Range lands are intermingled with the terraces and provide both the watershed and the soil which make farming there productive and practical.

Farming on these small fields is highly labor intensive, and it appears that marginally productive terraces are being abandoned in favor of the best sites. It is said that this is the result of young men emigrating to Saudi Arabia for high wages, leaving the farm work to women, children, and old men. It is reported that approximately 30 percent of the mature male labor force emigrated to Saudi in 1977 and returned \$1.4 billion in remittances. Many of the unused terraces are falling into disrepair; in some instances floods have breached the walls and cut deep gullies into the floors of the terrace soil. Unattended, terrace wall failure at the top of a terrace system can result in untold destruction by cutting through successive walls to the bottom of the slope.

In the present condition, water is harvested from steep range areas and brought onto terraces for irrigation purposes. In a moderately heavy rain storm, considerably more water arises than can be safely used on the terraces. This floodwater, loaded with precious topsoil, courses down the drainageway into the main wadi channel. Farmers there are prepared with diversion ridges reaching out into the channel to bring irrigation water onto low-lying fields along the wadi bottoms. Heavy storms in the headwaters frequently do serious damage to down stream farms, towns and cities. Even the large cities of Sana

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Taiz, and Hodeidah are subject to such floods, with resulting property damage, and at times loss of life. In this water-deficient system, loss of the water to the sea or into the desert is of serious consequence.

But most serious in the long term is the fatal progressive sickness known as desertification. This is the process by which a happy land of forests, verdant pastures, deep fertile soil, and flowing springs of clean, cold water feeding permanent, year round rivers, gradually at first, but with ever accelerating progress, changes to the situation described above. If not checked by aggressive action, eventually the happy land is converted into a desert, a land of desolation incapable of supporting a productive human society.

Range Management Knowledge and Practices

There is no indication of any native Yemeni having completed an undergraduate degree in range management. There are perhaps a half dozen expatriates from Egypt, Australia, England, and other donor countries working in Yemen. However, only one of these is directly involved in improving range conditions and practices. The one Yemeni range technician contacted is scheduled to go to Australia in the fall of 1979 to begin training in a range management curriculum. Obviously, a corps of professionals and technicians must be developed before proven scientific and technical principles of range management can be initiated. Expatriates from non-Arab countries face language and social deficiencies which seriously limit their ability to contribute.

In effect, the practicing range managers are the Yemeni farmers and Bedouin tribesmen. They are reported to be good animal husbandmen, but judging from observed conditions on rangelands, they have little knowledge of nor interest in range management. Essentially, they expect their range livestock to fend for themselves, with a minimum of thought given to the relationship of range condition to animal nutrition.

The most current YARG 5-year plan (2) includes statements recognizing the importance of erosion control through range and forest plantings in watershed areas. These activities will require removal of foraging animals during the renovation process, and use of proper management

practices, including proper stocking.

Overstocking is a serious problem on ranges throughout the country. Determination of proper range stocking is a relatively complex matter, not easily understood by native stockmen. Forage production varies from year to year with changing weather patterns, and livestock numbers respond to influences of disease, nutrition, and market fluctuations. Grazing animals can survive even on ranges overstocked 3-4 times proper capacity, (as these ranges appear to be), and stockmen gradually become inured to signs of malnutrition over the years. Modern range management procedures are required to analyze and solve this problem.

Traditional transhumanance patterns of range management are restricted primarily to the east desert areas and adjacent east slopes of the mountains with a smaller number operating out of the Tihama. Bedouin tribes manage their flocks in the time-proven methods of their ancestors, following the green feed from the desert lowlands in early spring to the mountains in the summer and back with the changing seasons. They follow the herds with their tents, and the work load is shared by all members of the family. Irrigation farming is practiced in this area also, using floodwaters flowing through wadis, as well as water drawn from wells by donkey power in large animal skins, or more recently, pumped with modern gasoline engines. Some farmers are semi-permanent residents of the cultivated lands, being occasionally forced from their homes by floods and resulting malarial conditions. They move with their flocks in tents prepared for this eventuality, and return when conditions allow. Bedouin shepherded tribesmen sometimes have blood relationships to sedentary farm tribes, and are thus able to arrange to pitch their tents near the farms at harvest time. Here they supplement family earnings by helping in the harvest, and may find supplemental feed for their herds in the aftermath. Tribal affiliations are strongly maintained, and related land ownership must be protected by armed resistance, especially in the northern and eastern grazing areas.

A large proportion of the livestock in the country are found in farm flocks and are held year-round within tribal boundaries adjacent to villages. These villages are often located on a prominence above

the valley to take advantage of a favorable defensive position. They dot the mountainous landscape from wadi bottoms to the tops of some of the higher peaks. Range land is intermixed with cultivated terraces, and contributes a significant proportion of the annual forage requirements of all classes of livestock. Livestock and cultivated land are individually owned, but range is grazed in common by the community band, usually under the care of children or women, herding on foot. Grazing privileges might be had on nearby village ranges, if in surplus, by mutual agreement, perhaps requiring a grazing fee. Crop aftermath, surplus grains, and on occasion purchased forages, may supplement range fare particularly during the dry season.

Range Livestock Management

Livestock commonly found on YAR ranges and farms include sheep, cattle, goats, donkeys, camels, and horses. Estimated numbers are as follows:

*Table 2. 1975 Estimated Livestock Numbers, YAR

<u>Kind</u>	<u>No. of farms</u>	<u>Slaughtered in Provincial Centers</u>
Sheep and goats	11,000,000	171,000
Cattle	950,000	39,000
Donkeys	650,000	---
Camels	105,000	---
Horses	3,000	---

*Adapted from (1).

It is reported that sheep numbers are decreasing, or are static, as a result of the reduced labor force. Even so, the ranges observed are apparently overstocked.

Livestock provide an important part of the nutrient requirements for human diets in Yemen. On the average farm will be found one donkey, 10-15 sheep and goats, and one milk cow. Farmers are able to slaughter a lamb or old ewe on special occasions but the price of meat on the local market is too high to allow regular use in most city family diets. For example, at the Mabar livestock souk on 1/8/79 the selling price on two common appearing ewes was quoted at YR 1,100 and 1,200 (\$241 and \$264), respectively.

The price of mutton has increased rapidly with inflation over the past 10 years:

Table 3. Average Price of Mutton in YAR, 1966-77 and 1979*

Year	YR/kg	\$/lb
1966	0.8	.08
67	1.0	.10
68	1.3	.13
69	4.5	.44
70	4.0	.40
71	7.0	.71
73	8.0	.80
74	12.0	1.22
75	18.0	1.82
76	25.0	2.53
77	45.0	4.53
79	60.0	6.06

* Adapted from (1) p. I/26

The price of frozen lamb from Australia in 1979 is YR 25/kg (\$2.53/lb), the differential reflecting a strong preference for locally produced mutton. It also indicates the impracticality of attempting to export YAR mutton in competition with other countries on the world market.

The high cost of forage and labor are important factors in this inflated price of local mutton. For example, green cut alfalfa, tied in 2 kg bunches, sells for YR2½ to 3/kg during the dry season (\$.51 to .65/kg or \$590/ton), and is hand-fed to livestock as a supplement to whatever they can find on the range. Green sorghum leaves are stripped individually from the stalks by hand, and after the grain is harvested, the stalks are fed. Sorghum varieties with large stalks are preferred, because of high forage production, even at the expense of grain yields.

Native Yemeni sheep observed are primarily of the fat-tail breed, and are of two types, hair sheep and wool sheep, with intermediates

being common. They are a small sheep, mature ewes weighing 18 to 20 kg on the hoof, and 6 month old lambs about 14 kg (9). The hair type tends to be slightly heavier than the wool type. The fat tails are considered to be a delicacy and bring a premium price in the market. They are a somewhat hardy breed, fairly resistant to the many diseases common to the area and good rustlers on the over grazed ranges. However, they have poor body conformation characteristics and probably a low cutting-out percentage. They show signs of long-term in-breeding including the small body size noted above and almost complete disappearance of ears. Body color ranges from white to brown to black, with intermediate solid shades as well as variegated patterns.

Wool production is nil on the hair breed and generally less than one kg on the wool breed. Intermediate individuals vary from traces of wool under the body hair to occasional guard hairs showing in the fleece. There is very little home manufacture of woolen products, which is reflected in the almost non-existent demand for wool. The labor cost of shearing is greater than the value of the fleece, so farmers prefer the hair breed, and discard the pelts of wool type lambs. The value of the fleece is insignificant when compared to the value of the carcass, so most producers believe that wool sheep are impractical and prefer the hair type. Comparative data on local and selected range sheep from other countries is given in Table 4.

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Table 4. Characteristics of Selected Sheep Breeds.

Breed	<u>Mature size</u>			<u>Wool production</u>		
	Rams kg	ewes kg	Lambs kg	Length cm	Grease kg	Grade
Yemen hair	26	20	14 ^{1/}	0	0	
Yemen wool	24	18	14 ^{1/}	5 to 10	1	Common
Moroccan Sardi	75	65	19 ^{2/}	1.8	1.6	3/8 to
U.S. Columbia	100	65	37 ^{3/}	9.0	5.5	3/8 blo

^{1/} —180 days
^{2/} —90 days
^{3/} —130 days

Lambing percentages are apparently quite good in some areas. The Wadi Rima report shows that Tihama area sheep operations average 100 percent lamb crops and 102 percent weaned lambs at 6 months (12). It is believed that a more accurate figure overall for Yemen sheep bands would be a 95 percent lamb crop with about 75 percent weaned at 6 months. These estimates are based on conversations with experienced field observers.

The Livestock Credit and Processing Project (World Bank assisted) has developed a sheep fattening project at Gerabeh, Wadi Surdu, which, when fully developed, will fatten 20 to 25 thousand lambs per year on 240 hectares of irrigated land. They buy feeder lambs on the local market in the fall, at the end of the green forage season when prices are low. They have plans also for modern abattoir and freezer plant construction in major Yemeni cities. This demonstration project will hopefully attract local entrepreneurs to similar activities, thus improving the marketing situation. Fall is the most advantageous time for farmers to market animals in excess of their dry season forage capacity, but without a fattening and cold storage program, massive sales at that time seriously depress the market price.

No hay storage was seen anywhere in the country. Although small quantities of old sorghum stalks were noted hung in the branches of trees 15 to 20 feet above the ground, it was not a significant amount compared to the need during the dry season.

Cattle appear to be exclusively of the Brahma breed. They are most often seen as single animals under the care of a child or woman, and apparently are kept for milk production. All appear to be in very thin body condition. Compared to Santa Gertrudis cattle, a breed developed in Texas and adapted to sub-tropical areas, the local cattle are probably quite inefficient, particularly in beef production. In Hodeidah, cattle were seen wandering unattended through the medina, further strengthening the opinion that cattle management practices are very primitive.

Calves make up an unusually large proportion of cattle slaughtered. They may go to market as early as 1 to 2 months of age due to the popularity of veal on the local market. Older animals and culls make up most of the remainder of marketed cattle.

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Calving percentage in the Tihama is reported to be 73%, and calves reaching 1 year of age 66% (12). These low figures probably represent a strong influence of low nutrition on reproductive capacity. Improved management could be expected to increase production fifteen to twenty percent at each of the above ages.

A large sprinkler irrigated pasture planting was observed about 5 km east of Yarim on an unimproved road. It appeared to be about 75 hectares in size, located on a level plain and fenced into several subunits which were obviously being grazed in a rotation system. It is reportedly a dairy herd production demonstration and represents the best pasture planting observed in Yemen. The unit is to be stocked with dairy cattle imported from Australia.

Beef production could also be greatly increased in Yemen by developing similar irrigated pastures for fattening beef cattle. The resources for such a development are available, including level land, pump irrigation water, and knowledge of pasture and livestock management. The King Ranch Company of Texas, U.S.A., established a beef ranch in Morocco that has been highly profitable. They stocked a 12,000 ha unit with 6,000 purebred Santa Gertrudis cattle, and thus added materially to the beef supply of that country. In view of the high price of meat in YAR, this would appear to be not only a profitable commercial venture, but also one helping to meet the food supply of the nation.

Oxen, donkeys and camels are commonly used as draft animals. It is quite usual to see an ox and a camel, or a donkey and a camel, or even a lone camel hitched to a wooden-shared plow in a small terrace field. These animals graze the sparse ranges when not being worked, but are often fed thinnings from sorghum fields or branches of leaves cut from nearby acacia trees to sustain them under draft. Wheel tractors purchased with remittance funds are replacing draft animals to some extent, promoted by the labor shortage and the added esteem a farmer receives among his neighbors from owning a tractor. They do considerable custom work in the community, mostly using modern moldboard plows that turn a furrow rather than simply stirring the soil as with the old

wooden plows. The turned furrow gives better weed control where that is a problem, and breaks up the plow pan formed by the wooden plows, but causes loss of important stored moisture brought up from the depths. Furthermore, large wheel tractors are causing serious damage to terrace walls and are difficult to move between small terraces. The British mechanization unit recommends that the ideal tractor is a Massey-Ferguson 35 wheel tractor furnished with a chisel bar implement that can be used for preparing a seedbed or adapted to cultivating between rows. If a plow is required, a set of disc plows (two or three) is recommended.

Range Management Education and Extension

Neither professional nor technical range management training is available in Yemen at the present time. Considering the importance of meat production and the critical nature of rangeland watersheds, this situation needs to be changed. However, the process is a long-term program because so few natives have the basic secondary education required for entry into advanced curricula. Literacy at a primary school level is estimated to be between fifteen and twenty percent, with a large proportion of these having been taught to read and write Arabic in Koranic schools. Educated persons are badly needed in government positions and are so rare that many government offices are backed up by expatriate counterparts from other Arabic countries, including Egypt, Sudan, Iran, Saudi Arabia, Jordan, and others.

At the University of Sana, the only institution of higher learning in YAR, there is not an agricultural curriculum, nor any course approaching the subject matter of range management. Nor is there any prospect that this subject will be taught there in the foreseeable future. Professional range management training can only be had by emigrating to an out-of-country university where the courses are available. A technician currently working on the LC&PP range improvement project at Dhamar is scheduled to attend range management training at an Australian university nextfall (1979). Others should be sent as soon as possible.

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The Range Improvement Center at Dhamar has programmed a one-year course for range technicians to begin in September, 1979, with facilities for sixteen students. The curriculum will include both classroom and field work of a practical nature. Reading material is printed in both Arabic and English. Lectures will be given in English and concurrently translated to the class in Arabic (both teachers are Australians). Subjects include principles of basic ecology, taxonomy, forage values, techniques for measuring yield and determining grazing capacity. They will also provide extension information to farmers on elementary principles of range management. A similar livestock technician school is planned for Sana, and may include range management subjects. The Ibb Agricultural School, supported by World Bank and CID, will provide general agriculture training for up to 200 students each year, hopefully beginning in the fall of 1979. A small amount of range subject matter will likely be included.

Extension in agriculture has been underway for about three years, and appears to be making good progress. The Southern Upland Rural Development Project, supported by World Bank, is beginning to use in-country educated para-professionals for direct contact with farmers. Livestock information related to range management is included. They have noted that women are required to do more of the farm work, and to make decisions with their husbands out of the country working. Consequently SURDP has hired women agents who are able to communicate with women farmers. Men, especially foreign men, are not allowed to contact Arab women on any subject.

Range Management Research

Research into the solution of Yemen range management problems has received only a limited amount of attention from YARG. The Range Improvement Center, a unit of LC&PP located at Dhamar, initiated a limited species adaptation trial in 1977, with treatments including fertilization and irrigation. Preliminary results have been extended to three large field planting trials totalling approximately 77 hectares in cooperation with two village Development Associations. The testing, planning and

application phases have been done in an effective manner. They also have established a small nursery used to produce trees and shrubs to be included in range renovation trials. Species found to be most useful include Acacia spp. and drought tolerant Eucalyptus spp.

The field of research is practically wide open on Yemeni ranges. A serious problem exists in governmental organization in that there is no unit in the Ministry of Agriculture with the specific responsibility for range management activities. The Ministry of Agriculture recognizes livestock and forestry as separate divisions, but range management is not claimed by either. This confusing situation should be clarified, perhaps by establishment of a separate unit of government, where attention can be focused specifically on range management problems.

The Central Research Project, located at Taiz, is charged with the responsibility of conducting research in the agricultural sector. However, this organization is concentrating its efforts on fruit and vegetable production, and specifically excludes range management, forestry and livestock research.

The Central Planning Office of YARG has conducted an economic feasibility study of afforestation on abandoned terraces, and found that practice to be practical. The German government assisted with funding, and plans to take leadership along with other European countries, in implementing the practice.

Many problems of range, forestry, and livestock similar to those found in YAR have been solved in other countries. Some of these solutions can be transferred directly, while others must be adapted to local conditions by additional research and development. Full advantage should be taken of these opportunities to shorten the time element.

Certain basic information is required before research in these fields can begin. Three items are (1) a research herbarium, (2) a library of working tools, and (3) reliable weather data. These items should be generated in at the earliest possible time.

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Brief description of other existing and proposed assistance efforts

1. Livestock credit and Processing Project. (Support by YARG, IERD, Kuwait Fund, and Netherlands, contracted by Hendrickson Associates Consultants, GEM, Frankfurt)

- a. Feeding operation located at Gurabeh, Wadi Surud. Expect to fatten 10-25,000 sheep/year on 240 ha of irrigated land.
- b. Plan to do breed improvement work to increase mature ewe weight from 18-20 kg. to 30 kg.
- c. Livestock and Range Improvement Division has species adaptation trials at Dhamar, fenced range seeding trials in cooperation with Village Development Associations at Al Chariba and Thelan (totalling 77 ha in 3 units).
- d. They plan to initiate an eleven month range technician course at Dhamar for 16 candidates, possibly in the fall of 1979. Lectures and printed materials will be in English with translation into Arabic. Material examined is elementary, but sound.
- e. A slaughter house has been built at Sana and contracts are being let for similar construction at Hodeidah and Taiz. Meat market construction is planned for Sana, Hodeidah and Taiz, and freezer storage plants are in the more distant future.
- f. Overseas training for selected YAR candidates.
- g. Other activities only peripherally related to range and forestry programs.

2. USAID Title XII Ibb School. Agricultural technician training, which at present includes livestock production, but not forestry or range management.

3. German Government and European Economic Community. YARG Central Planning Office used a German team to determine that afforestation of abandoned terraces is economically feasible. The EEC and German Government are planning to finance (0.5 million and 5.7 million German marks, respectively) to provide two professional foresters for the initiation of the planting program.

4. Montane Plains and Wadi Rima Project, Ministry of Overseas Development, U.K. A survey team has completed a land and water resources survey

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in the subject area, providing detailed descriptions of physical, social, economic and agricultural settings. Recommendations include "grass reseeding, shrub planting, animal health improvements . . . and installation of stock watering facilities." They also recommend investigation of "alternative approaches to grazing management, control of livestock numbers, improved supplementary feeding, and also animal breeding". Other recommendations covering the broad area of agricultural development are also made.

5. Range Restoration, Reforestation and Pasture Improvement. (A typed report dated 22/2/78, prepared by K. Kuneman, Project Manager, Livestock Project MOA; N. Aulagi, Prof. of Econ. Unive. of YAR; and J. Schroeder, Mgr. Livestock and Range Division MOA; provided to AID Title XII Team Forester by Erik Holberg, LC&PP on 21/7/79). This paper provides a detailed outline of an approximately correct procedure to accomplish activities defined in the title. However, many of the plant species recommended for planting have little probability for success. This paper appears to be the inspiration for LC&PP Dhamar Livestock and Range Improvement Division activities.

6. Directorate of Forestry, MOA (M. Juneide, consultant) Activities:
 (a) Establishment of new forest nurseries to produce 4 million seedlings by 1985
 (b) Afforest 500 ha in the next 5 years, including bare areas, village fuel areas, sand dune stabilization, and farm windbreaks.
 (c) Evaluation of previously introduced species.

7. Central Research Project, Taiz (IBRD) Research activities mostly restricted to fruits and vegetables, but may include forage in the future.

8. Southern Uplands Rural Development Project, Taiz (IBRD assisted). This organization has done pioneering work in extension procedures in villages of the area surrounding Taiz and IBb. They use para-professionals with a preparatory school background plus a 1-year technician course in some general fields of agriculture, home economics, or engineering. They have built extension offices in several locations, and their agents work from these, going directly into homes with their information. They have recently added an expert in the preparation of

audio visual aids, including movies, slide-tape series and radio tapes. They have also recently established a range reseeding demonstration near Ibb, using information developed at Dhamar by the LC&PP Range Improvement Center.

9. Rada Integrated Rural Development Project. (Dutch assisted). They have indicated a strong interest in reseeding large range enclosures, and have received material from LC&PP at Dhamar to begin preliminary trials. (See Martin De Groot, Dutch Embassy).

General Comments: There are obviously many donor organizations active in YAR, offering assistance in the agricultural area. My strong impression is that the appearance of a well funded organization such as USAID on the scene has developed a natural reaction of "protectivism" regarding their areas of endeavor. On the surface, the subjects of forestry, range management, and livestock appear to be covered, either by on-going work, or planned programs. However, when their ambitious planned programs are measured against their available resources, and the scale of work needing to be accomplished, it is very clear the additional help is needed to hurry programs along. In a letter from Tony O'Brian (LC&PP Livestock and Range Improvement Division) he diplomatically pointed out that the Southern Uplands Rural Development Project had sought permission from them and signed a formal agreement allowing SURDP to install large area range reseeding trials. There is a wide opportunity for work in this area, especially for a well-funded organization, but careful coordination with those already established will be a rigid requirement.

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Appendix

Trip Reports

Ministry of Agriculture visit
Central Planning Office visit
Livestock Credit and Processing Project
Range Improvement Centre, Dhahar
British Mechanization Project
Central Research Project
Ministry of Agriculture, Hodeida
Extension Directory
Southern Upland Rural Development Project
Madinat Al Abid

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Trip Report: 12/7/79 and 13/7/79 in Sana at the Ministry of Agriculture. I visited with four men in their offices and was always given courteous assistance. Following is an account of information provided:

Visit with M. Juneide, United Nations Development Programme, Office of The Resident Representative, Sana, Yemen Arab Republic, P. O. Box 551.

Main activities:

1. Establishment of new forest nurseries to produce 1.5 million seedlings 1980-81, 2.0 million 1981-82; 2.5 million 1982-83; 3.0 million 1983/84; 4.0 million 84-85.

Species: *Acacia cynophylla* from Australia (good forage tree); in Saudi and Jordan (not here).

Artemisia herba alba -- flavors meat and ghee

2. Afforestation of 500 ha's in the coming 5 years, including
- a. Bare land afforestation
 - b. Village fuel areas
 - c. Sand dune stabilization
 - d. Windbreaks
3. Evaluation of previously introduced forest species.

MOA officers met there

H. Ashwal -- Director of Forestry

M. Mo'affi -- Director of Nurseries

The British have a forestry project and have promised to send a professional, but he hasn't arrived yet.

13/7/79

Visit with Ali Abdullah, Counterpart of C.P.O. (Sudanese). He strongly believes local associations and private business men will work out their own problems, and do it more effectively than a bureaucracy which might be set up to control: qat, pump wells, etc.

CPO is the only planning unit in Government, as such, in Yemen.

Planners are not capable of "Macro" level planning -- work at the

"firm" level of economics.

There was a serious effort to plan for changes in Yemen.

1st job of CPO was to organize all of the resources coming from outside donors (World Bank, Kuwait, USAID and Arab countries).

Yemen had essentially no resources of its own in Central Government.

1st plan was a 3-year program 1972-75 — YRls 975,000,000. 138 million allocated to Ag. program 1972, actually spent only 112.

Big factor in recent economy has been Yemeni working in Saudi and sending money back. 1.4 billion in 1978.

Shortage of labor raised wages to point farmers can't afford to hire help. Much of marginal land has become submarginal and abandoned. YR Gov't provides only 41% of total budget, outside sources 59%.

LDA— Local development association -- farmers organize to get local improvements needed at their own expense. Don't wait for AR central Govt.

90% of population live on the land, 73% are farmers. 10% live in cities "If you don't take care of the 90% they will take care of the 10%.

Well drilling is turning out to be a disaster.

Council of Yemen Development Society is organizing to bring order. 7 member board: 3 elected, 4 appointed by Government.

Their objective is to help the LDAs.

Visit with Dr. M. El-Menshauni — Economist

(Egyptian employed by German Govt.)

The German Govt. has provided a team to help CPO with a feasibility study to determine the practicality of afforestation on abandoned terraces. A pilot project will be conducted at Haraz, and has been determined to be economic. German govt. plans to invest 5.7 million marks in establishing trees at Haraz.

The European Economic Community has plans to bring 2 professional foresters to Yemen to begin the project.

0.5 million German marks appropriated to assist Yemen govt. in afforestation effort on a national level -- whole country.

M. Juneide comments on this project:

On Wadi Surdud, primarily for erosion control at village Manakhah. This project is under the supervision of the MOA, Director of Forestry.

Visit with Erik Halberg (Danish expatriate): Livestock Credit and Processing Project, supported by World Bank, Kuwait Fund and others.

Work contacted to German consulting firm, Hendrikson & Hendrikson.

1. Fattening operation, located at Gerabeh, Wadi Surdud. Objective, when fully developed, is to fatten 20-25 M sheep/year on 240 ha irrigated land. They buy feeders in the local market -- later on hope to do breeding trials, with demonstration and short courses.

Native sheep rarely reach 18-20 kg at maturity. LCPP think they can raise mature weight to 30 Kg.

Lambs are weaned at 90 days, feed lambs for 140 days more; use fat-tail varieties. Yemeni farmers take good care of animals, but don't know much about nutrition or breeding. Usually choose best animals for meat or sale.

Don't cure fodder for use during season of short feed. In Tihama, natural fodder gets scarce in April and lasts until August. Fall rains bring on good forage crop again. No alfalfa grown in Tihama now.

LCPP will be starting trials with alfalfa there soon.

When temperature exceeds 25 C for extended periods, as in Tihama, alfalfa is poorly adapted and yields are relatively low. See LC&PP reports for details.

Alfalfa grows well in mountain valleys even with frost.

Value in dry season at Sana: 2 1/3 -3 YR/kg (51-65¢/kg) \$590/ton.

Breeding herds are held on range, fed sorghum stalks, etc. Leaves are stripped individually from sorghum stalks while green. Grain removed when mature. Stalks cut and sold for forage with a value about equal to grain. "Stalky" varieties preferred. Roots are dug after harvest and used or sold for fuel.

Sheep are individually owned, but communally grazed under the control of small boys or girls.

Biggest lamb sales take place at Eid al Fitr on 24th to 28th August this year. Ramadan 25/7 to 23/8, 1979 and about 40 days later: Adel Khat when each household head must slaughter a lamb for the feast.

Lambing percentage estimates: IBRD — 90: LC&PP — 1.40.

In October a lamb cost 700-800 YR (\$150-175). Cost farmer 15 YR to produce (at least that's what LC&PP costs).

Imported Australian lamb, frozen, inspected, costs \pm 25 YR/kg. Local lamb preferred brings 60 YR/kg.

Many Somalia sheep brought in, but unpopular — unpalatable!

Wool not a factor in sale price of sheep. Value is so low about 5 YR (\$1.10) for hide -- 750 YR for live sheep! Consequently incremental value of wool is so small it is not important.

Imported forage also has less appeal than locally produced. Imported 350-400 YR/ton; local 1500 YR (\$185-200 vs. \$330).

By law, all slaughtering for resale must take place in approved slaughterhouses.

LC&PP has established an approved slaughterhouse, and plans to establish locker plants to supply meat shops. Butcher shops must be licensed. Fresh meat must be sold the same day butchered.

LC&PP has a range management project Dhamar. Tony O'Brian is director (— go visit him).

Lambs are born just before green forage season, sold along with dries and other non-essential animals at the beginning of the dry season. Prices are low at the time everyone is selling, and high at the beginning of the green forage season, when everyone wants to stock the range.

Trip Report 15/7/79 to visit the Range Improvement Center at Dhamar
Pcpt: 400 mm/yr Spring and Fall

Tony O'Brian -- Manager; Range Improvement Center, LC&PP, Dhamar
Mail: LC&PP, Ministry of Agriculture, P.O. Box 836, Sana, Yemen.

Karl Graeser -- Livestock specialist -- Inventoried livestock in Yemen.

David Lamont -- Range & Training officer; Australia oriented. On leave -- Father ill.

Al Chariba -- Nursery Operator, range planting technician.

Ali Milik -- counterpart to O'Brian; going to Australia to school next year.

LCAPP conducts a range tech. training course in Sana. Includes such things as ecology of pastures, forage value, etc. Lectures are printed in English/Arabic. Lectures are translated as given ("very difficult" -- Tony O'Brian). Course covers 1 year period (also give shorter course).

LCAPP also have definite plans for a Range Management course to be given at Dhanar. They will have facilities for 16 students and 2 lecturers. This will be a residential school, (begin Fall 1979?). Tony O'Brian will teach $\frac{1}{2}$ time, $\frac{1}{2}$ time research management. David Lamont -- New training officer teach $\frac{1}{2}$ time, $\frac{1}{2}$ time research management.

They will also provide extension services, bring in farmers.

Their livestock officer, Karl Graeser, will give guest lectures at school. He is now just completing a survey of livestock products markets, etc.

Forage Research: 1. Irrigated with fertilizer trials. 2. Dryland. Irrigated trials are for water spreading projects, higher rainfall areas, or dairy production. Plots are flood-irrigated from nearby pump wells, clipped for production determinations. Ali Milik handles the crew-- a rag-tag bunch of common local people.

Unirrigated trials: He thinks temperate region grasses are doing better than those from tropics at this location, including *Agropyron intermedium*, *Lolium per.* 5-2' good: short and dense (tame variety most productive) *Dactylis glomerata* (Palestine), *Phalaris* spp. (fair), *Festuca (elatior* (?) *Eragrostis curruia*, *Elymus juncens* (low productivity), *Bouteloua gracilis* and *B. hirsuta* (fair), Switch grass (very poor), *Agropyron elongatum* (good). Legumes: Alfalfa, several varieties: *Palestinium*

vigorous first year, native variety catches up 2nd year. Strawberry clover was dense, good yield: Ladino "white" clover and Ladino "Louisiana" clover both looked good. Best alfalfa in the irrigated trials was "Galilee" variety. Trifolium semipilosum (Kenya white clover) is susceptible to a virus 1st year, but is O.K. second year and grazing resistant. Berseem clover, (annual, but reseeding well into 2nd year here) is the most productive of all clovers in this trials. Vicia vilose (vetch) plot lost by close harvesting. Trifolium africanus: competes well under irrigation, large seeded perennial.

Dryland Trials: planted in ("bund") basins similar to irrigated plots, within "bunds". Yield and stand density was much less than on irrigated plots: Avg. precipitation 400+ mm/year: Drought this year. Best alfalfa: Bahadhi variety. Best grasses (perennial) Tall and Intermediate wheatgrass (Agropyron elongatum and A. intermedium) Best shrub: Australian Saltbush (Atriplex halimus). A. numilaria was successfully established from seed!

Good to fair grasses: Orchard grass (Dactylis glomerata) Buffel grass (Australian variety "Biloela") Queensland. Orchard grass (strain?) -- fair to good; Nigai (Pennisetum spp.) fair.

Forb: Sanfoin (Onobrycus spp.) -- fair.

Several other plants species were tested with indifferent results.

Tony thinks day-length is an important factor in triggering seed production. Most (cool) temperate zone plants are controlled by long day length conditions for seed production.

Visit to Tree and Plant Nursery (LD&PP) Dhamar.

Tony took me to his nursery in the center of Dhamar where they grow the plants they plant out on the range. It appeared to be about 1/2 ha or less in extent surrounded by a mud wall. Plants are started in black polyethylene "socks" about 10 cm in diameter and 15 cm deep. Shade is provided by burlap hung over frames above the beds. Tree species are Acacia spp and Eucalyptus spp. and are started from cuttings mostly. He also had some salt cedar (Tamarisk galica) cuttings taken from a tree within the nursery which had broken in the wind. These were not starting

well. I estimate the total content of the nursery to be about one thousand seedlings when I visited. They found it necessary to cover plot surfaces with gravel to increase permeability of the surface water, and to reduce surface temperature of soils.

Visit to Range Plantings

LC&PP group at Dhamar has organized "Village Development Association" in two locations south of Dhamar. The village farmers have asked the range improvement group to come in and help them reseed to improve production. In each case the YARG has rented the land and assisted planting operations, including help with fences. At Al Chariba about 40 ha of abandoned terraces were plowed and planted to acacia, eucalyptus and grasses and forbs last fall; also 20 ha of hill. None looked good at this time due to present drought conditions, but germination was good and survival of enough to make a stand seems assured if rains come soon. This area is about 15 km SE on the road to Radaa. Another site, about 25 km south on the road to Ibb, is located on a butte, and consists of about 17 ha at Thelan. Plantings were made roughly on contour strips approximately 5-10 meters apart. The soil surface was covered by desert pavement, and worked with a chisel implement to open it up for seeding. Acacia and eucalyptus tree starts, taken from the Dhamar nursery, were planted at 5-10 meter intervals along the ripped furrows, in small basins in the soil. Survival appeared to be about 80% even in this drought year. Many native grasses appeared to be benefiting from the protection from grazing provided by the fence.

Returned same day after noon.

British Mechanization Project: Taiz 17/7/79

James Williams, Director; Abdul Shamiree, Counterpart

Jerry , expatriate assistant
(Get annual report from Ray Forte (USAID) for full details).

Program consists of:

1. Field evaluation of mechanical equipment for Yemen Ag.

Conclusions: The Massey-Ferguson 35 wheel tractor is ideal for use by farmers in Ibb/Taiz area (most farmers want larger). The best accessory

implement is a set of 2.3 meter cultivators for rain-fed areas, or 2 to 3 disc plow in heavier rainfall and irrigated areas, where soil must be turned over for weed control. The cultivator does sufficient soil stirring in dry areas. can be equipped with a seed box for planting with tubes leading into furrow behind chisels, and also adapted to mechanized cultivation for weed control in the crop. There is little use for larger tractors: they are difficult to manipulate on the small fields, break down terrace walls, and cost too much to purchase, maintain, and operate. The project is now evaluating reversible disc and moldboard plows which allow more efficient plowing on small fields. Two threshers are now recommended: (1) a very light weight "separator" (not a thresher in the full sense) for sorghum and (2) a small tractor driven thresher developed specifically for the Ibb/Taiz area. The latter currently costs about 11,000 YR.

2. Training: Full course runs 11 months (Sept. - July), takes in 10-15 students per term; staff consists of 7 British staff plus counterparts. Ninety percent of the material presented is practical hands-on experience. providing training to the introductory Ag. Engineering level. Most enrollees have 9 years of previous education, are 17-20 years old, and will be hired either as extension agents or commercial technicians. Most come from the Taiz area. The unit also gives two short courses of 1 week duration each year.

3. Farmer extension training. They travel directly to villages where extension agents have scheduled two to three day sessions on tractor maintenance and use. Farmers bring their own tractors or just come and listen. The curriculum includes (a) daily maintenance procedures (b) weekly and (c) monthly items. Few farmers know anything about maintenance. Most don't even know they should change air and oil filters.

4. Advisory service to government agencies on importation, etc. The project has a consultant in Sana to advise as needed.

5. Service work for other projects and agencies. They repair pumps, tractors, and other equipment on an emergency basis.

James Williams had the following opinions to express: 1. The best cultivation is performed by animal power. However, labor is in short supply and

animal output is slow. 2. Carrying water to homes is an effective way of rationing it. If water is piped to homes, much more will be used, and water is scarce in Yemen. 3. A fisheries project could be very effective in increasing protein availability in Yemen. It could include organization of cooperatives, cold storage, transport, marketing, etc. 4. Potato acreages are increasing rapidly. Yields are 6-8 tons/ha rainfed and 20 tons irrigated. They are grown irrigated at Dhamar and rainfed at Ibb. The mechanization project gave a planting demonstration last April, and harvesting 17/7/79.

Visit to Central Research Project, Taiz. Dr. Faud (IBRD)

This station is conducting research on several agricultural crops, including sugar beets, wheat, barley, maize, sorghum, squash, several vegetables, papayas, guavas, cotton, etc. They have only 3 technical staff (cereal agronomist, cotton agronomist, and plant pathologist). They are recruiting for eight more. Dr. Faud thinks sugar beets will become an important crop because at present all sugar must be imported. They grow well rainfed in Ibb countryside, but must be irrigated at Dhamar. They have a small forest nursery at Dhamar, but not doing much with it. Grow a few acacia and eucalyptus.

When asked what the important problems needing attention are, possibly nation-wide, in Yemen, he replied:

1. Range Management is number one! Grazing management is neglected but very important.
2. Animal husbandry (not dairy) needs special attention: Breeds, nutrition, management. Introduce rams and bulls of selected, adapted breeds.
3. Watershed management and water management. (He noted that CSU is doing some management in Tihama).

Departed 6:00 a.m. 17/7/79 and returned 20/7/79.

Visit to (UNDP) FAO Ministry of Agriculture, Hodeida

19/7/79

Mr. Twari, Director, representative (Nepalese)

Precipitation 80-150 mm near coast, 300-350 mm along the coastal road where we traveled from Taiz to Hodeida, and 1000 mm at Ibb. There are 8 wadis along the Red Sea coast of Yemen. Wadi Rima might be a good one for our experimental watershed approach. Twari reacted favorably to my

suggestion for an AID project on integrated watershed management. He indicated that the British have studied Wadi Rima and should be able to provide information that would be helpful in evaluating the possibility of further work there. The Wadi Rima has a road, but of the poor, dirt surface variety.

From his point of view, control of sand dunes movement onto fields is the most pressing problem in the Tihama at present. He said, "I hope you will send me some sand dune grasses right away." Both trees and grasses are a possibility, but adaptation trials will be required before any extensive plantings can be made.

There is also a problem of preventing salt sea water from intruding into the water table where heavy pumping is underway near the coast. This is a common phenomenon around the world, so if there is an answer, it should already be available in the literature. Gene Foerster suggested planting salt cedar (Tamarix galica) near the beach to draw on the salt water and block it off. Doubt it would work.

He said he was not aware of any range seeding work in the Tihama; he has neither read of it nor heard it mentioned in discussions.

Visit to Extension Office: A. K. Al Ansi 21/7/70

At the Ministry of Agriculture in Sana.

Suggests teaching and working at the same time. Give practical experience that the farmer can use. Need immediate results: farmers have been discouraged by "surveys" and long-term sorghum breeding programs.

Poultry Extension : Must carefully select cooperators so the program will not be destroyed by sale or death of chickens.

Women as Agricultural producers: Very important project, and it should be started at Taiz. Teach in English or Arabic? Answer: must be in Arabic. Choose a very good teacher who probably be a Yemeni woman! Bring in an Egyptian (or other) woman specialist to teach Yemeni student (woman) who would then become the extension agent and take the information to the housewives who take care of the poultry.

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He wants the extension agent to be the only one to have contact with the farmer. Expatriate specialist should work with the extension agent and train him.

Extension training is carried on by FAO-Egyptians at Taiz (near British Mach. Project). After Ibb school gets started other extension training centers will be closed for beginners. Extension trainees will spend 1 year at Ibb and if they are to become specialists, they will go to Taiz or other.

Trip Report: Departed at noon 27/7/79 and returned to Sana 1:00 p.m.
29/7/79

Visit with Southern Upland Rural Development Program, Taiz

El-Kheir, Director

This project stretches along the Sana-Taiz highway from the pass north of Ibb, through Ibb to Taiz and Turbah, taking in villages on either side of the highway. Projects include engineering activities such as improving roads to villages, and developing water supplies by drilling wells, building water storage tanks, installing pumps to fill the tanks, and piping water to villages. They also help farmers with all kinds of information and demonstrations on agriculture and home economics. They have built extension offices in several communities, and staffed them with para-professionals educated at the high school level, plus a 1-year short course in some general field of agriculture or home economics. With a shortage of young men on the farms to do the agricultural labor (emigrated to Saudi to earn big wages) the agricultural decisions are being made by women. Consequently, the extension programs need to be focused on women. SURDP, realizing this, hired 2 Swedish women to initiate a program. Men, and particularly foreign men, cannot contact successfully, Yemeni women, and the Swedish women were successful in the second village, when they had the Swedish women train a few select Yemeni and Egyptian women, who in turn trained housewives right in their home villages. First subjects were house cleaning, cooking, sewing, etc.; later after confidence was established, came lessons on raising chickens,

sheep, etc. Irrigation, plowing, and all manner of technical ag. subjects.

They have realized the need for audio-visuals in their programs, and sent one of their men to Turin, Italy, to get trained. They are developing movies, slide series, radio tapes, and other programs to spread the information in more palatable forms.

Director El-Kheir (Egyptian Director of SURDP), offered to make arrangements for me with Hani Khallaf, Egyptian livestock man at Ibb for SURDP, to show me range plantings at Ibb tomorrow morning.

2nd Visit at British Mechanization Project, Taiz. 28.7/79

Jerry , Assistant Director suggested the following AID Projects:

1. Developing solar power for use in cooking in the villages-- the sun shines every day!
2. A team for coordinating the work of the many donors, to prevent overlap of programs.

Visit to Madinat Al Abid Wednesday 1/8/79 -- Grant A Harris

Departed 6:00 a.m. in company with Don Heckerman, Jennabee Harris and driver Mohamed Jamali in the driver's Toyota 4-wheel drive station wagon. Proceeded to Mabar, 1 hour south of Sana and turned west at Mabar toward Madinat Al Abid on a hard-surfaced but washboard road.

It was Souk Day in Mabar, so we stopped on the southwestern outskirts of town to observe the livestock market about to open. There were several small bands of sheep present with a group of native men gathered around each. After some introductions by our driver and interpreter, we were able to determine the asking price on two typical native sheep as follows: one wool-type fat-tail individual with variegated white and black coloring, weighing about 18 kg was being held for YR 1,100 (\$240), while a similar animal weighing about 20 kg and entirely white had an asking price of YR 1,200 (\$264).

The road crosses the Mabar plain westward to a low ridge and drops into the headwaters of Wadi Sirham, which at this point consists of a broad, relatively flat basin. The principal crop here is sorghum, grown on broad terraces sloping gradually westward. There is considerable uncultivated land capable of being seeded to grass or planted to trees, intermixed with

the general matrix of cultivated land. These areas are sidehill areas also, but these are covered with desert pavement intermixed with large rock outcrops, frequently cut through by deep gully erosion, variably too steep for treatment. Evidence of accelerated erosion including uncontrolled flooding and washing of cultivated fields, roads, and uncultivated areas is everywhere present. It is clearly obvious that without corrective watershed management and range management practices this upland agricultural area, as well as the newly developing irrigation farmland at the mouths of the wadis will shortly be destroyed. All the signs of incipient desertification are clearly evident to one experienced in these matters. Immediate action is required if the area is to be saved at all. Every season of delay will result in greatly increased effort and cost to repair the damage. Every effort should be made with USAID to call this serious situation to the attention of YARG.

The road climbed out of Wadi Sirhan and crossed a divide into what we interpreted to be the headwaters of Wadi Rima. This is a high plateau with beautiful fields of well-kept terraces, surrounding picturesque villages always located on high promontories. The precipitation is judged to be higher here as evidenced by better crops and a heavier cover of range plants. Unfortunately, the same signs of accelerated erosion can be seen here as described above.

On the return trip to Mabar, I was saddened as I reviewed again the eventual destruction of these farms, and the destitution and suffering that will come to these people, unless they become properly alarmed and take corrective action.

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SECTION M

INDIVIDUAL TEAM MEMBER REPORT

C.I.D. SUPPORT PAPER NO. 1
YEMENI L.D.A.S AND AGRICULTURAL
COOPERATIVES; THEIR
COMPOSITION AND CHARACTERISTICS

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Agricultural Economist

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and

Design Team Member

July 27, 1979

YEMEN'S LDAS, THEIR COMPOSITION AND CHARACTERISTICS

Origin and Background

The need to improve basic resident standard of living is most critical in the rural areas of the YAR. While nominal public services are available in the Republic's urban centers, in the rural areas the residents still live in a rather primitive state. These rural communities are often isolated and have no schools, health facilities or related public services. The government acknowledgement of these conditions is long standing. As early as 1963 it issued a law facilitating the establishment of organizations to be known as Local Development Associations. The underlying basis for this legislation was to provide an incentive for the development of local self-help organization rather than forcing residents to become increasingly more reliant on initiative and programs provided by the central government (a philosophy which remains quite pervasive).

Early establishment of LDA's was suppressed by the Civil War (1962-1970). By 1970, however, the formation of LDA's became more common, particularly in the governorates of Sana, Taiz, Ibb, and Hajja. By 1978, such organizations numbered 150, most of which could be found in the aforementioned governorates.^{1/}

Structure and Functions

While the LDA are not organized as cooperatives in the classical sense, their functional attributes are generally analogous to those of cooperative organizations. The LDA, itself, is governed locally by a General Council (e.g. as would be true of a cooperatives' Board of Directors). The membership of this Council is elected from the general population of the Nahiyahs, i.e. local districts or sub-districts. Villages and hamlets within the district gather to elect, for a 3 year term, one representative to serve on the Council. One representative is elected for every 300-800 persons residing within the community (except where the community population exceeds 800, in which case one representative is elected for each 500 residents). Based on average Nahiyah population nationwide, membership on a General Council typically numbers 40

^{1/}"Yemen Arab Republic, Development of a Traditional Economy," A World Bank Country Study, January 1979, p. 82.

to 50 representatives.

Acting much like cooperative patron advisory boards, the LDA establishes a Village Committee which consists of one person appointed from each village within the Nahiyah and one elected member from the General Council itself. It is through this Village Committee that village development projects are originated and subsequently submitted to the General Council for approval.

Each LDA General Council, itself elects an Administrative Committee number five to seven persons. This Committee then elects from amongst its ranks, persons to fill the positions of President of the LDA, General Secretary, and Deputy General Secretary. In this regard, the Administrative Committee functions much as would the Executive Committee of a cooperative organization. The President of the LDA serves much as would the President of a Board of Directors, in that he would always serve on the Administrative Committee and handles the day-to-day affairs of the LDA. All officers of the Administrative Committee are elected for 3 year terms. The election, itself, is supervised by three persons, one each representing the Confederation of Yemeni Development Associations, the Ministry of Labor and Social Affairs, and the Office of the Governor.

Charts 1 and 2 suggest the structural analogy between the classical cooperative and the LDC's. The similarities are quite apparent. It should be noted however, that some differences do also exist. For example, members of the cooperative Patron Advisory Board are elected rather than appointed and members of the Board of Directors do not also serve on the Advisory Board. While the cooperative Executive Committee is presided over by the President of Cooperative, it rarely directly employs a staff. Conversely, the Executive Committee may establish several permanent committees for finance, membership, etc., comprised of selected members from amongst their own ranks.

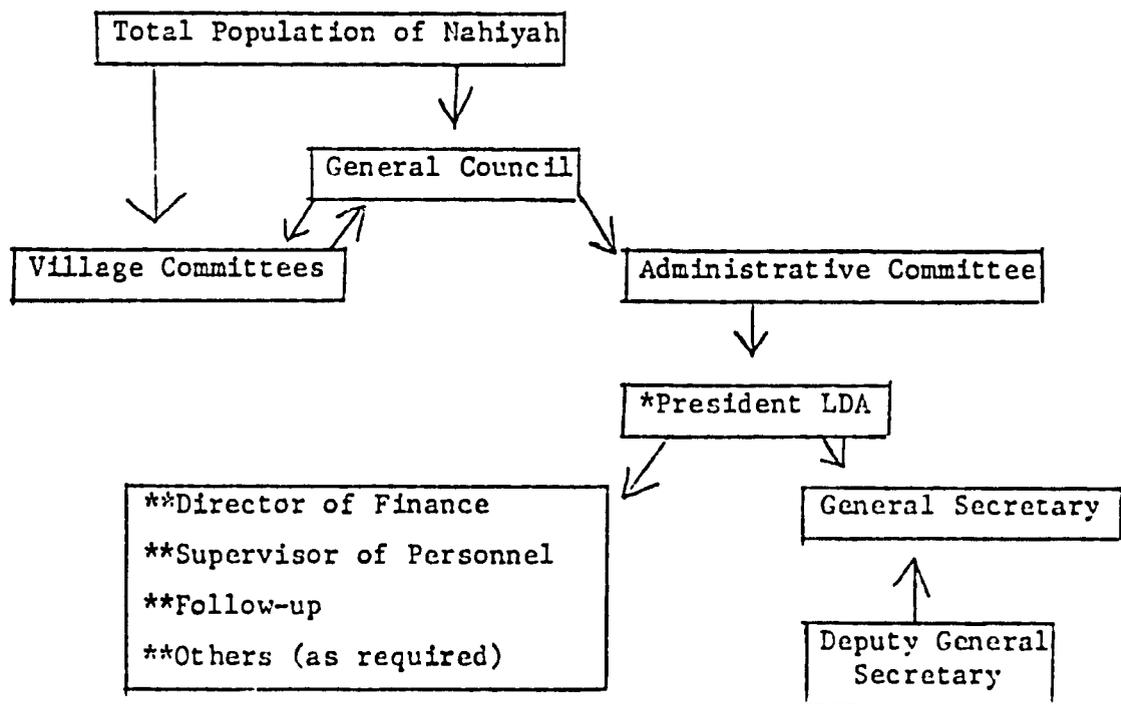
Governorate and National LDA Affiliations

For governorate-wide representation, the LDAs within each governorate have established a LDA-Coordinating Council. This Council is comprised of the LDA President from within each governorate and it elects a General Secretary, Deputy General Secretary and Finance Director. As shown in Chart 3, the Governor serves as the honorary head of the CC, but general operational responsibilities rest with the General Secretary. Functional activities are performed

by the various employed division support staff.

National LDA representation is affected through the establishment of the General Assembly of the Confederation of Yemeni Development Associations. This Assembly is comprised of the General Secretaries of all the LDA/CC's in the country. The General Assembly, itself, elects a General Secretary and Deputy General Secretary. It also provides for LDA representation with all Governors and the President of the Yemen Arab Republic (see Chart 4). The General Assembly also employs support staff in several functional divisions, sections, and units.

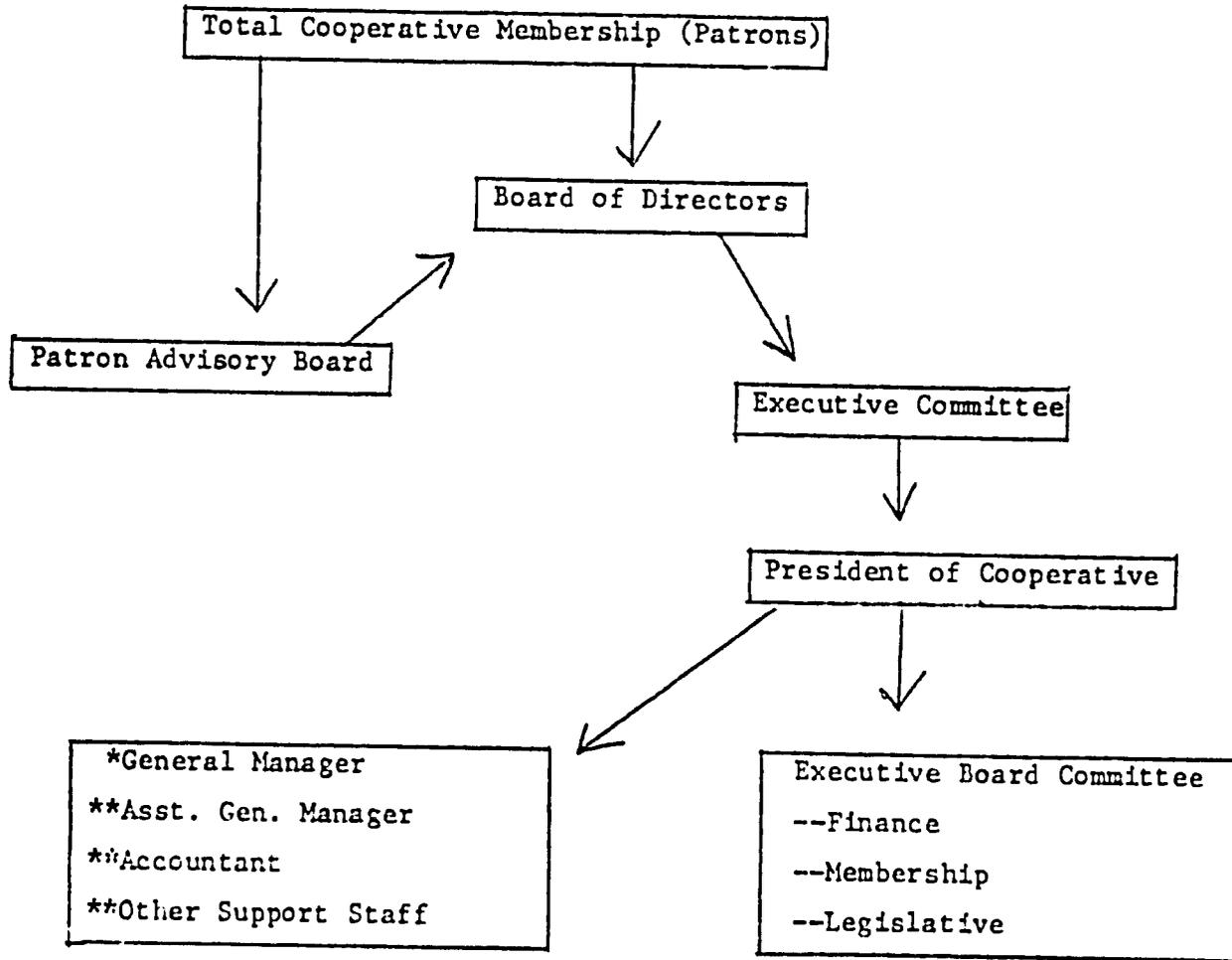
Chart 1. ORGANIZATIONAL STRUCTURE OF LDAG



* Elected by Administrative Committee

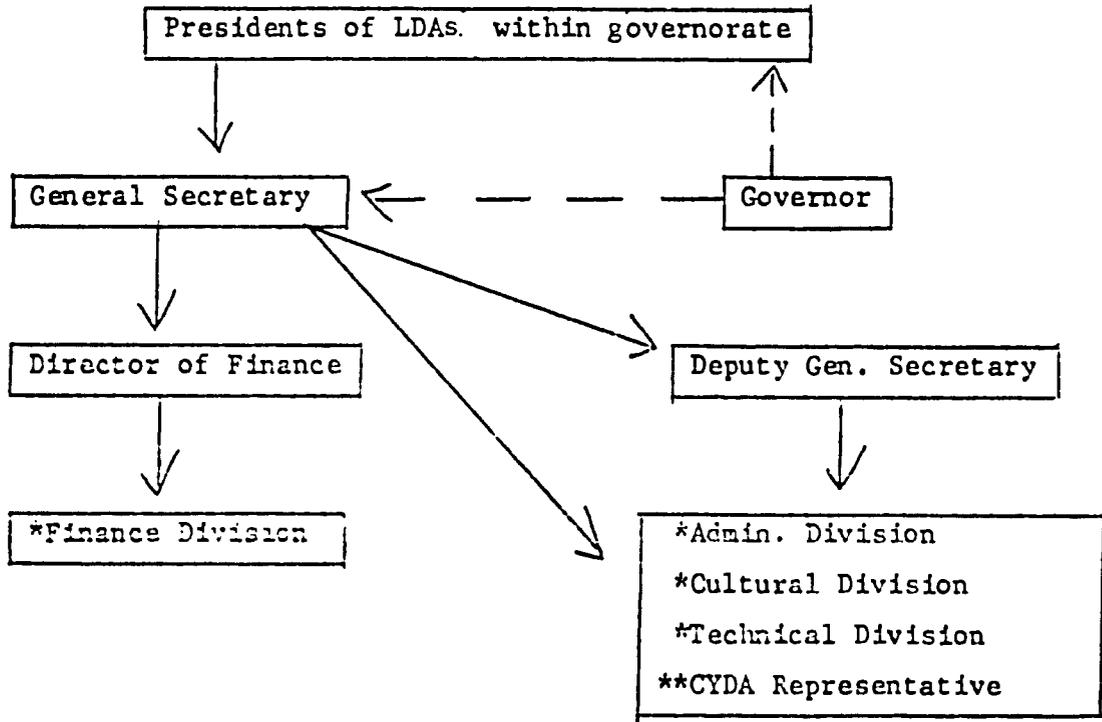
** Employed by LDAs

Chart 2. ORGANIZATIONAL STRUCTURE OF COOPERATIVES



* Employed by Board of Directors
 ** Employed by Cooperative

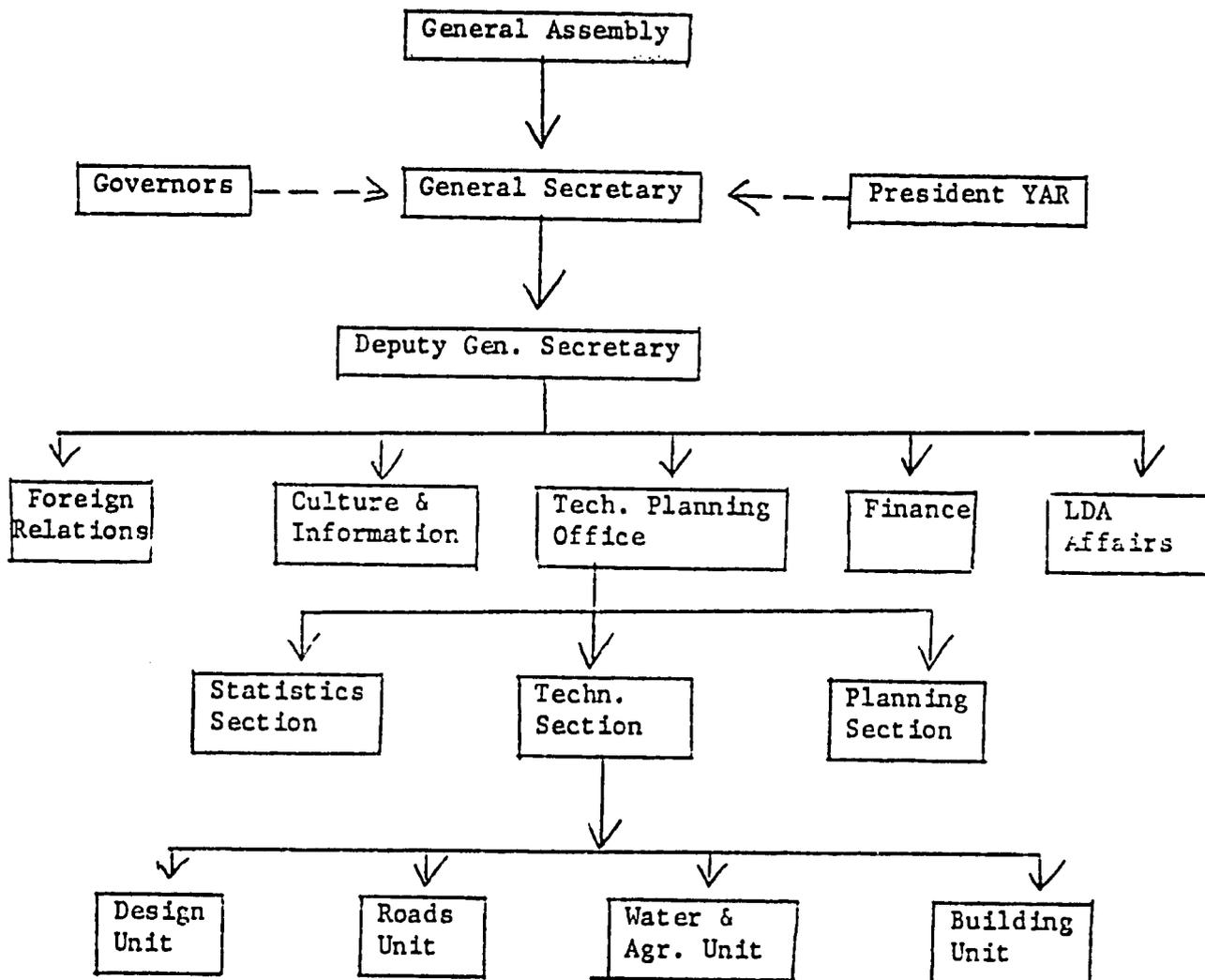
Chart 3. LDA/CC ORGANIZATIONAL STRUCTURE



* Employed by LDA/CC

** Appointed by CYDA

Chart 4. GENERAL ASSEMBLY ORGANIZATIONAL STRUCTURE



ORIGINS AND ACTIVITIES OF CYDA

The origin of CYDA is closely associated with the political careers of members of previous governments. Still it has been argued that CYDA is developing an institutional capability of its own.^{1/} Its political sensitivity is evidenced by its policy of disbursing exactly the same amount of project funds to each governorate, thereby transferring to the governorate much of the responsibility for allocating funds between different projects and villages.

It should be noted however, that CYDA is not purely a facilitative body. The fact that it has been given a coordinating role for the variety of donor projects which are proposed by non-Yemenis in various regions of the country would suggest that it would behoove CID to associate itself with CYDA at least informally, and to report operations and activities to them, particularly where project activities relate even indirectly to LDA

CYDA Assessment:

It has been suggested that data provided by government bodies will provide a poor quantitative assessment of the CYDA organization, or for that matter, the performance of any specific LDA. As already noted, they have already opted out of any decision to manage the distribution of funds between governorates. It is unlikely, therefore, that CYDA would take any initiative in pushing one project or suppressing another. This suggests that those LDAs receiving less than sufficient funding from CYDA, but who have an open access to central government ministries, will capitalize on this access when they are unsuccessful with CYDA. LDA assessment efforts, therefore must be most heavily reliant on site visits and less dependent upon CYDA data or ministerial subjective judgment.

LDA vs. COOPERATIVE:

Some substantial uncertainty remains concerning the unique organizational and compositional distinctions between LDA's and cooperatives. While it is difficult to generalize, the LDA refers to a village or subdistrict-wide organization representing the interests of all its residents. Cooperatives are more often comprised of members with selected occupational similarities, e.g. farming or fishing. To the extent that a cooperative is successful,

^{1/} Trip Report: M. W. Wenner (CYDA/LDA) 4-78, 279-0045.

the benefits accrue to the entire community residents, members and non-members alike. It can also be reasonably understood why a single governorate district or subdistrict might contain both a LDA and an operating cooperative. In some areas, cooperatives existed prior to the 1970 LDA formation. Hence the cooperative itself later became an LDA to better avail itself of financial and technical assistance. Elsewhere, the LDA preceded the cooperative, the latter being formed to more selectively serve a specific occupational group within the district or sub-district.

M. W. Wenner^{1/} has hypothesized that LDAs and cooperatives have distinctively different objectives and political purposes. Wenner argues the following:

The LDAs are an organic outgrowth of the long tradition of local self-help traditions in rural Yemen. Even though they were promoted by former president Al-Hamdi for political purposes, it seems clear that these organizations grew out of local needs and problems and they have a life of their own viable enough to remain unaffected by the political goals or promotional activities of the central government.

Cooperatives, as argued by Wenner, appear to be the creation of the central government and its various ministries. The purpose of these cooperatives, he asserts, is not cooperation between individuals and small organizations for the purpose of marketing or joint agricultural activity. Rather, Wenner maintains that these cooperatives were designed to put across to their member patrons certain ideals, i.e. a kind of quasi-educational institution used to instill specific values being promoted by the current ministry or central government.

Having reviewed Wenner's work and completed an independent analysis of my own, I would strongly disagree with his conclusions. Moreover, I would assert that the assessment parameters as related to LDAs vs. cooperatives should be reversed. Because LDAs have a centralized representative organization (CYDA), they become a more effective and available vehicle for the distribution of government doctrine. This is also supported by the

^{1/} M. W. Wenner, Trip Report (CYDA/LDA) 4-78, 279-0045

fact that tax funds for LDA projects originate from within a centralized structure. Finally, LDAs are representative of all community residents, thereby, facilitating a broader government impact. As operating enterprises, cooperatives need not be dependent on central government support, either technical or financial. Their membership is selective, often restricted, and committed to a philosophy that production, marketing, and resource acquisition can be more positively affected by working together than separately. Such a philosophy fosters a pride in oneself and his organization, and a correspondingly diminished influence by the central government in village or sub-district affairs.

Organizational Incentives:

Following the civil war, it became readily apparent that central government influence throughout the countryside was almost non-existent. In an attempt to fill the void, the government attempted to organize several LDAs in the early 1970s. As first designed, each LDA was to encompass the whole of a province. It soon became clear that interdistrict rivalries and suspicions between residents of different villages rendered a province-wide LDA impossible. Because zakat taxes were involved, district residents preferred to see their taxes used to finance projects within their own nahiyah rather than elsewhere in the province. By 1975, therefore, LDAs were only being established at the nahiyah level.^{1/}

Inherent within the government's attempt to establish LDAs was their desire to establish a central government influence clear to the village level. Further, such organizations were designed to fill the void of a local infrastructure and establish an environment for self-help within which some external financial and technical assistance could be provided. All households within the nahiyahs were to participate in and benefit from such projects equally.

It has been suggested that the organization of LDAs were designed to capitalize on the heavy labor out-migration and remittances situation existing throughout the rural areas, i.e. as the migrants returned with substantial savings, they were more inclined to search for ways of improving their living standards and village-wide service.

^{1/} David Gow, "Case Studies Ag. Coops LDA's " YAR-Rural Development 279-0045, 8-24-78.

Central Government Intervention in Cooperative/LDA Formation:

To date, central government intervention has materialized in three forms 1) A small amount (rarely more than 1/3) of financial aid will be supplied directly from government ministries for the completion of LDA projects, 2) technical assistance is provided by government ministries, and 3) some technical and financial assistance has been provided by the Confederation of Yemeni Development Associations. It is difficult to generalize the degree to which the central government influences the formation of LDAs or cooperatives. The enabling law of 1963 provided slight encouragement and tacit approval for such organizations. In reality there appears to be at best three basic sources of organizational incentives.

First, and perhaps the most common, the organizational incentive may evolve internally to the village or sub-district. The local shaykh may have had occasion to travel to neighboring Saudi Arabia where he viewed village life at a more advanced state. Returning to his own village, the Shaykh initiates plans to organize his villagers, assess a tax for equity capital, and provide the leadership for providing public improvements.

Once it is organized, the LDA elects members to the General Council and Administrative Committee. Quite often the shaykh becomes the president of the LDA and committee membership is comprised of the local leaders, i.e. merchants and large farmers.

This is not necessarily always the case, however, as it is often the so-called "youth shaykh" who travels to Saudi Arabia and upon his return organizes an effort for community or agricultural improvements. As suggested this sometimes creates the setting for a power struggle between the elder shaykh and his youthful counterpart. The following discussions relating to the formation of the Al-Lawiah Cooperative are meant to be illustrative of the more successful LDA/cooperative formations. It is also illustrative of the second most common form of organizational incentive, i.e. externally imposed initiative.

THE AL-LAWIAH COOPERATIVE IN TIHAMA

Several attempts to form cooperatives in this region of the Tihama failed because they were too large. The basic philosophy underlying the Al-Lawiah Cooperative society was the belief that people can work better together than individually. The purpose of the cooperative, apart from the provision of certain services available to both members and non-members, was the provision of a guaranteed export market for okra, a service available

only to members. Its formation was the result of the initiative of a local UNDP extension worker who perceived the potential of the region and approached a group of the more progressive local farmers (also the large landowners) with the proposal for considering the organization of an okra producing and exporting cooperative.

Capital was initially generated through the sales of okra in the cooperative. In its first year, 1976, there were 80 members who purchased a total of \$20,000 worth of cooperative equity. By 1970, this had grown to 300 patron and \$40,000 in total equity capital. The ACB chose not to loan directly to the coop, so it loaned \$1200 each to individual members for the purchase of needed equipment. As the equipment began to generate cash flows, the ACB credits were repaid.

By the second year of operation, the cooperative's net worth had grown to an estimated \$111,000-133,000 and profits of \$60,000 (a portion of which were redistributed to members in the form of additional share capital). The stock dividend was expected to reach \$8.57 per share, a return of 39 percent over a two year period. Attempts to secure medium-term credit from the ACB for the purchase of capital equity have proven difficult. ACB has insisted that cooperative patron land be used as collateral and has appraised that land at \$600/hectare. Patrons, however, insist that their land (irrigated) now supports a market price of \$9,000/hectare. Upon visiting with ACB officials, it was learned that they remain reluctant to loan directly to agricultural cooperatives. As a separate entity the cooperative, itself, owns few real assets relative to the magnitude of the debt capital required--hence collateral is generally insufficient. Using the cooperative as a pass-through organization has also proven unsatisfactory. Once the cooperative receives the loan advance from ACB, the President (the local shaykh) disperses it amongst the tribe's farmers. As the farmers repay their loans to the cooperative later in the year, the shaykh has sometimes retained the funds for his own personal use.

When asked why the ACB selects such a small value for land as collateral, they explain that there exists no true market for land as it rarely, if ever, changes ownership.

A third form of organizational incentive may be that imposed externally by institutional pressures and a form of competition or envy between villages or sub-districts. A local shaykh, no doubt, uses a successful LPA or cooperative to enhance his image and broaden his influence. This does not go unnoticed by the leadership of other neighborhood villages. Before long, they also wish to emulate this enviable development.

Financing and Operations of LDA's and Cooperatives:

Financial support for the operation of an LDA or a cooperative may be internally or externally derived. If internally derived, the organization, under the leadership of the president (shaykh) may assess a membership equity fee or tax of each member or resident. The level of this assessment rests with the shaykh's judgment as to each individual's willingness to pay. As local autonomous organizations, the cooperatives or LDAs may proceed with a development project or an agricultural activity solely on the basis of their own internal financial support.

If external financial assistance is requested, it may be secured from two principal sources: 1) 75 percent of the tax (Zakat), see Appendix A, on agriculture within the Nahiyah and/or 2) 5 percent of the value of imports into the Nahiyah. This latter source is divided evenly amongst all existing LDAs --with rural LDAs receiving one-half of that which is allocated to urban LDAs. Zakat and import funds are held in the Yemen Bank for Reconstruction and Development. Each LDA may draw from this account as its individual projects are approved by the LDA/CC. The CC, itself, receives an operating budget for office and transportation expenses. This budget also covers salaries ranging from 300-15,000 rials per month for such employees as a bookkeeper, secretary, messenger, a driver, a mechanic, etc. LDA projects are audited annually by the CC and periodically by CYDA.

As a part of the YARG First Five Year Plan (1976-81), each operating LDA was required to develop its own five year plan showing complementarities to the national plan in four specific areas, e.g. water, roads, education, and health, see Appendix B. Most LDAs fulfilled this requirement such that each year their project request follows closely that outlined in their larger plan. Such plans are designed to reflect the expressed needs of the village represented by the LDA. Once approved by the CC, the plans are transmitted to CYDA for final approval. Usually all CC approved projects are transmitted to CYDA annually. Once final approval from CYDA is obtained, funds are released by the Yemen Bank for Reconstruction and Development for use by the LDA. Table 1 is provided to illustrate the government contribution to LDA projects in the two governorates of Hajja and Hodeida. The average YARG contribution to each LDA was 100,000 YR for rural LDAs and twice that for urban LDAs see Table 1.

As referenced earlier, some LDA projects may be partially or fully financed with local funds. The president of the LDA may set a per capita sum to be collected, the shaykh may subjectively assess the households in

the area or, each male may be charged the sum he daily spends for qat. For projects to be financed jointly, local funds will typically be used to initiate the project and carry it to 1/3 completion. With CYDA approval, their allotment will pay for the second third of the project. Once the project (e.g. a school, well, road, electrical generator) is 2/3 complete, the LDA may petition the appropriate central government line ministry for the final 1/3 funding support. This distribution of shared authority is described in Table 2.

It should be noted that the entire above description is a generalization derived from personal interviews, my own interpretation of CYDA regulations and USAID observations of individual LDAs. Characteristic of their autonomy, each LDA/cooperative operates in an individualistic manner, determined by its set of resources, needs and the influences of its leadership.

Observations and Recommendations:

The organization of LDAs /cooperatives since the early 1970s has had a significant and positive impact on the lives of the rural Yemeni people. An impressive number of "public works" type of projects have been completed. New and improved roads have lessened the degree of isolation of rural residents. They have facilitated their access to urban-based services and markets. Health services have improved in rural Yemen, but only at the most nominal level. Numerous schools have been constructed so that over the next decade the shockingly high rate of illiteracy, particularly amongst rural women, should begin to lessen. Drilled wells and water delivery systems are still being established in many rural areas. Unfortunately, little is known about the hydrology of the region and water tables are dropping in some areas. For the rural farmers, cooperatives have assisted in the acquisition and importation of pumps, electric generators, tractors, tillage equipment, and trucks. Such organizations have also assisted in the marketing of fresh and/or processed agricultural produce. In terms of the future, the success of the existing LDA's/cooperatives is likely to prove to be the greatest incentive for the establishment of new and more diverse organizations. External incentives are needed and useful, but they cannot supplant the need for continued success of those organizations already operating.

In my personal opinion, C.I.D. programs in rural Yemen must incorporate the following:

- 1) Access to and utilization of existing LDA s/cooperatives in the initiation of all rural based programs.

Table 1. CYDA Contributions to LDA Projects in 1975/76*

Governorate	No. Projects	People	Contribution (U.S. \$000)		Total Cost
			LDA	Gov't Other	
Hajja Total	346	2375	1343	369	3994
Road	50	1869	764	309	2848
Classrooms	80	204	264	38	506
Water	210	274	271	5	550
Health	6	28	45	17	90
Hodeidah Total	188	567	1245	0.5	1812
Roads	8	226	98	0.5	324
Classrooms	138	315	762		1077
Water	34	21	322		343
Health	8	5	63		68

*Source: CYDA Records 1978

Table 2. Distribution of Financial Responsibility for LDA Projects *

	<u>% Responsible</u>
A. Education	
Central Government	33
LDA	33
Local People	33
B. Water Projects	
Central Government	25
LDA	25
Local People	50
C. Health Projects	
Central Government	25
LDA	25
Local People	50
D. Road Projects	
1-20 kms length	
LDA and local People	100
20-30 kms length	
LDA and Local People	75
Central Government	25
30 kms + length	
LDA and Local People	50
Central Government	50

* Source: CYDA Records 1977

2) Support for the continued success of existing LDA s/cooperatives by the inclusion of cooperative management and finance instructors at the Ibb Agricultural School. This could be facilitated by inviting each LDA or cooperative to send one young man from its village to study at Ibb.

3) Use of the new and existing extension workers within an area as the catalysts for introducing improvements. Encourage these extension workers to become the vehicle through which cooperatives are organized. CID personnel should not become directly involved in cooperative formation as a failure in this effort would likely reduce their effectiveness in other areas. LDAs and cooperatives should retain their indigenous reputation and not be transfigured by the process of "Americanization".

Additional Comments:

There exists a continual temptation to assess Yemeni cooperatives and LDAs within a framework tied to the basic Rochdale Principles. Indeed such an assessment would be most unfavorable for the local Yemeni organizations as they rarely subscribe to classical cooperative principles in a practical sense. In my opinion, these organizations must be judged relative to their effectiveness and utility within the existing Yemeni environment and not on the basis of their compliance with the principles of democratic control or economic efficacy. In support of this statement, I offer the following comment

1) Rural LDAs or cooperatives may appear to operate within an organizational framework consistent with democratic control. Rarely, however, is this a practical reality as pre-existing tribal leadership must support the establishment of such organizations and typically the shaykh becomes both the elected and practical leader. Neither is the governance of the organization truly representative of the village or sub-district residents. Most commonly, the Council and Admin. Committee membership is comprised of local influential merchants and/or large land owners. It is often said that small farmers, particularly tenant farmers, have neither the education nor the time to serve in such capacity.

2) The incentive for organizational formation may be either internal or external. Where an area is strongly governed by a shaykh, it would seem prudent to rely most heavily on internal incentives. In such areas

where an extension worker is already well accepted, this form of external incentive might be capitalized on. For example, the extension worker may be invited to the Ibb Agricultural School for a special semester's training in cooperative management and finance.

3) Special care must be taken when attempting to organize an LDA or cooperative. Intense rivalries and/or social chasms may exist between villages within a small geographical area. Early attempts to organize across broad areas were met with internal dissention and failure. Use existing cohesiveness within small groups to facilitate smaller organizations. Do not expect cooperatives or LDA's to supercede or otherwise suppress political or social differences between villages or occupational groups of people.

4) The assembly of equity capital is often contrary to classic cooperative philosophy. Involuntary assessments more often than not, become the vehicle for accumulating a minimal equity base. Further, such a base of funds may be fully expended in the pursuit of a project such that a subsequent assessment is required to re-establish a financial base.

5) In any attempt to work with local LDAs or cooperatives, CID must access that organization only with the prior knowledge, approval, and support of national, governorate, and LDA/CC representatives. While the LDA or cooperative is, itself, very autonomous, to access the local organization lacking governorate and CYDA support would be inviting unnecessary suspicion and seeds of distrust.

6) It is necessary that all CID personnel, particularly those working at the village or sub-district level, recognize "shaykh vs. youth shaykh" conflicts which may evolve within a cooperative or LDA. Because such conflicts may halt or alter entirely the organization's progress, CID personnel should remain neutral if at all possible.

7) Direct financing of cooperatives by the Agricultural Credit Bank has not been overly successful. Because most such organizations have few assets, the ACB now asks that cooperative member land be used as collateral. Due to the lack of a true market for agricultural land,

this collateral is often undervalued. If the cooperative is used as a pass-through of debt capital for farmers, repayments are sometimes retained by the local shaykh. To deal effectively with the existing needs, the ACB should receive special government or World Bank funding to establish a special "high risk" source of debt capital for cooperatives.

8) CID personnel should always keep in mind that to the extent that a LDA/cooperative is dependent upon CYDA and government Ministry financial support, its project plans must be established for long periods of time and show a degree of complementarity with the YARG five year plan. Such requirements may impose rigidities on LDA/cooperative programs not otherwise envisioned.

9) It should be noted that LDAs may be either rural or urban based. As such, the objectives and functions of such organizations may differ.

In summary form, Figure 1 suggests those positive and negative factors impacting the formation of LDA s/cooperatives in rural Yemen.

Figure 1
SUMMARY OF FACTORS IMPACTING
THE FORMATION OF AGRICULTURAL
COOPERATIVES IN YEMEN

Positive	Negative
1) Pre-existence of local rural LDA with Governorate and YARG support.	1) Lack of a representative social structure where shared governance is practiced.
2) Tribal-sociological philosophy conducive to accomplishment by groups.	2) Education and training deficiencies for cooperative management and finance.
3) Import and Zakat tax incentives provided by CYLDA.	3) Restrictions on the distribution of financial assistance and regulations on debt capital financing by ACB.
4) Magnitude of program and capital needs are large enough to require group action.	4) Market restrictions and uncertainties, e.g. unknown export market potential, uncertain export prices, straits, follow-up and service to imported technology lack of etc.
5) Diversity of projects broad enough to require external assistance, both technical and financial.	5) Environmental constraints linked to distribution and logistics, e.g. some villages remain isolated, or unable to store products.
6) Strong and receptive desire by rural residents to improve economic situation.	6) Limited compatibility between farmers of different villages or sub-districts.

Appendix A

"Zakat" Tax Explained

Honesty Zakat--Tax at the rate of 2.5% of value of gold, silver,
and other personal wealth

Petraah Zakat--Tax paid yearly on each individual, equal to the
cost of 5.5 lbs. of grain

Wealth Zakat--Tax on capital assets of merchants and traders
at the rate of 2.5%

Agricultural Zakat--10% of the total value of crops on ra and
land and 5% of the total value of the cro, radi
or numn-fed land (including qat). Zakat is paid
before the division of the crop between owner and
sharecropper

Other Incomes--Contributions by wealthy people during Islamic feast

Appendix B

DEVELOPMENT EXPENDITURES OF LDAS
DURING YARG 5-YEAR PLAN *

(YR million)

<u>Projects</u>	<u>Amount</u>
Access Roads	615
Schools	268
Water Supply	103
Public Health	58
Other	94
Unidentified	325
Total	1463

* Source: Table VII-7, n. 84, Yemen Arab Republic, Development of Traditional Economy-A World Bank Country Study, Jan. 1'

INDIVIDUAL TEAM MEMBERS REPORT

C.I.D. Support Paper No. 2

AGRICULTURAL CREDIT IN YEMEN;
ORIGINS, COMPOSITION AND LIMITATIONS

MICROFILMED FROM BEST
AVAILABLE COPY

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and

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July 28, 1979

Introduction

As is suggested by Scheme I, the origins of agricultural credit in Yemen are diverse and complex. Moreover, the infrastructure within which credit services are now being provided remains in a state of flux. At the present time, ACF funds continue to provide debt finance to the numerous I.D.A. projects. The ACB is now in its third year of operation, providing loans direct to farmers and, in selected cases, farmer co-operatives. While a plan for the proposed merger of ACF and ACB was formulated, the completion of such actions had, by mid 1979, not yet been achieved. Hence, Yemen farmers receive institutionalized credit services indirectly via their I.D.A. projects. They may also receive indirect services via their agricultural cooperative or directly from a branch of the ACB.

The Agricultural Credit Fund Origin

The ACF was established administratively within the Central Bank in 1974. Its operations were funded by the World Bank and designed to serve the debt capital of the IDA Development Project. Loans were made for a part of fiscal year 1974/75, but the first full year of operation was at their Wadi Zabid Branch during 1975/76. In addition, the ACF began to extend credit in connection with the SURDEP Project in 1976. Ultimately, the ACF was to extend credit to all four IDA projects, i.e., TDA, SURDEP, Grain Storage and Processing Project and the Livestock Credit and Processing Project. Funds available for financing the four projects via the ACF will total approximately US \$40 million. ACF operates with a staff of 28; 2 officers at Central Bank headquarters, 1 local and 1 expatriate; 10 at the Ibb Branch, 9 local and 1 expatriate; 11 at the Wadi Zabid branch, including 1 expatriate and 5 local staff at the Wadi Zabid branch, including 1 expatriate and 5 local staff at the Wadi Mawr Branch. As shown below, the ACF exceeded its target loans in both term categories:

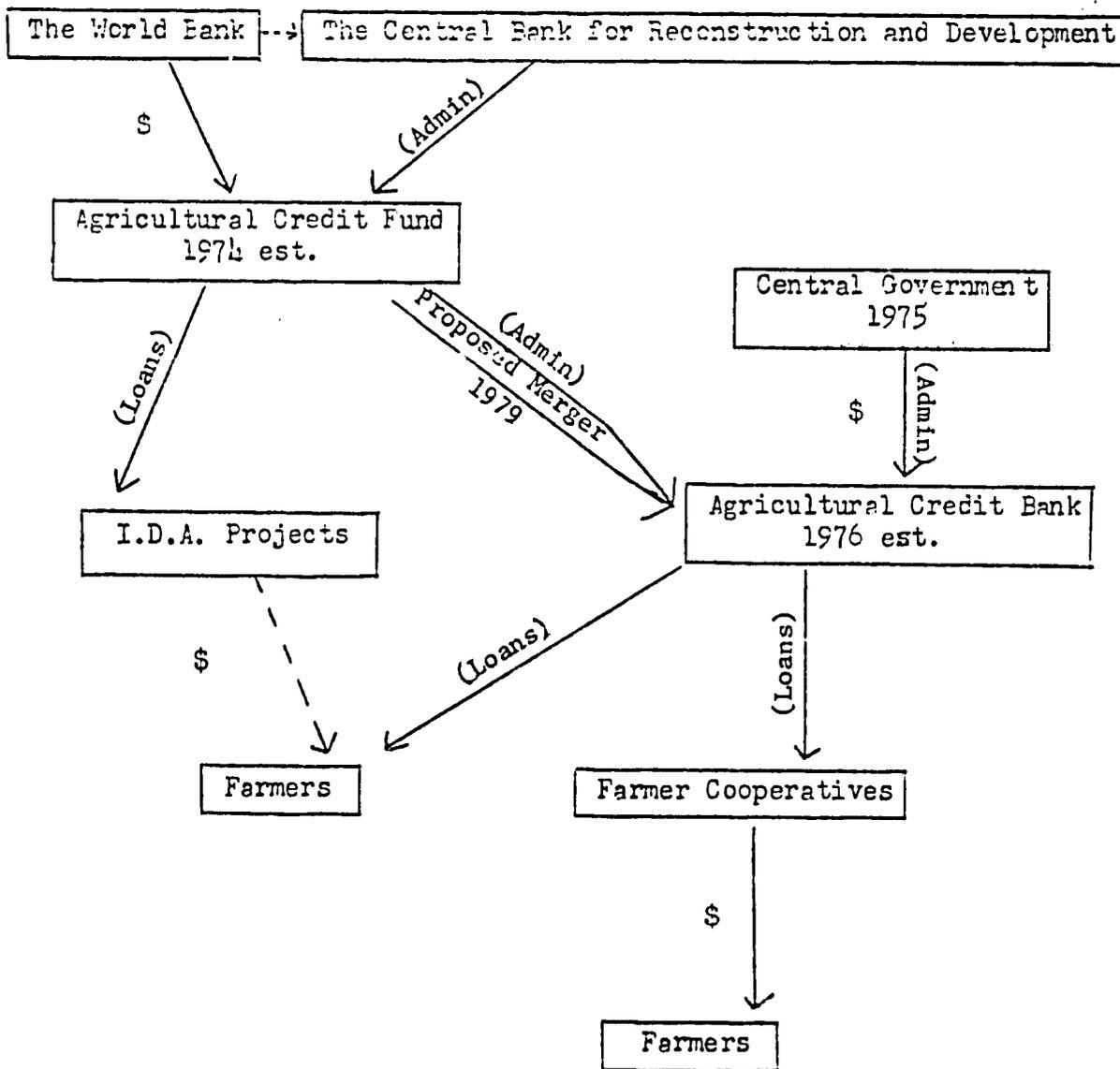
ACF Loans - 1974-76 (YR000,000)

<u>Type</u>	<u>Target</u>	<u>Actual</u>
Short Term	4.5	8.8
Medium Term (TDA)	-	2.5

As shown in Table I, four IDA projects are now being served by the ACF, i.e., TDA, SURDEP, Grain Storage, and Livestock Credit.

Scheme I

EVOLUTION OF ACF/ACB SERVICE TO YEMEN AGRICULTURE



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Table I
 LOAN TERMS UNDER THE YEMEN AGRICULTURAL
 CREDIT FUND*

(Medium and Long-Term Loans)

<u>Loan Categories by Project</u>	<u>Grace Period</u>	<u>Repayment Period</u>	<u>Total Repayment Period</u>
TDA Project:			
Groundwater Development	2 yrs.	8	10
Farm Machinery	2	5	7
On-Farm Development	2	8	10
Processing & Storage	2	8	10
SURDEP Project:			
Wells, Pumps	1	5	6
Orchards & Coffee	4	6	10
Processing & Storage	2	8	10
Grain Storage Project:			
Silo - YGCC	5	9	14
Warehouses - YGCC	4	10	14
Bakeries - YGCC	3	10	13
Private Bakeries - New	3	5	8
Private Bakeries - Modernized	1	4	5
Livestock Credit Project:			
Livestock Finishing - LDC	5	5	10
Dairy Farms - LDC	4	7	11
Milk Colonies - LDC	5	4	9
Poultry Feedmill- LDC	4	8	12
Village Development	6	5	11
Landowners Credit	2	4	6
Tenant Credit	3	4	7
Small Poultry Farms	1	6	7
Butchers	1	1	2

YGCC - Yemen General Grain Corporation

LDC - Livestock Development Corporation

* Source: "Activities of ACF and ACB", Supervision Report, Agricultural Division, EMENA (February 1977)

Each loan category within each project is assigned a grace period and a repayment period commensurate with a project's construction and pay-off requirements. Large construction projects, such as those found in grain storage, are allotted a 4-5 year grace period and a 9-10 year repayment period. Other more immediate activities, such as the acquisition of farm machinery (TDA), are allotted 2 years grace and 5 years repayment.

Table 2 comprises only fragmentary data relating to the ACF operation. However, it does suggest some serious limitations to the scope of ACF services. For example, data describing SUPDEF lending by ACF suggest that the acceptance rate for loan applications is less than one-third overall and low as 3 percent in the tractor and machinery category. One must seriously question the reasons for ACF acceptance of such a small proportion of total loan applications. It is not known whether the answer lies in the quality of the application, the credit worthiness of the applicant, the ultra conservatism of the ACF, or their abnormally high standards for credit acceptance. A second observation relating to the ACF financing of loans to TIA is the relatively small amounts loaned to the average applicant. In Wadi Zabid, for example, seasonal production loans averaged less than 400CYR each.

The Agricultural Credit Bank Origins:

As it currently exists, the Agricultural Credit Bank was established with the enactment of law No. 21 of 1975. This law declared that the ACB begin operations 10 July 1976 with powers being so constituted as follows (see Appendix A):

- 1) The objective of the ACB shall be to make loans for financing agricultural enterprises and operations relating thereto with the aim of developing agriculture, irrigation and forestry and contributing to the promotion of agricultural and livestock production in the country and encouraging and supporting the agricultural cooperatives within the framework of the State general policy also, improving and establishing agrarian and livestock industries.
- 2) The ACB has the power to litigate on its own as plaintiff or defendant or retain in the course of carrying out legal proceedings relating to its work or to any other purposes the Attorney General or any other person.

Table 2

LENDING ACTIVITIES OF A.C.F. and ACB - 1976-77 *
(YR000)

Lending by ACF to SURDEP (up to 2/77):

<u>Purpose</u>	<u>Applications</u>		<u>Executed</u>		<u>Accept.</u>
	<u>No.</u>	<u>Amt.</u>	<u>No.</u>	<u>Amt.</u>	<u>Rate</u> <u>% No</u>
Tractors & Machinery	66	6280	2	170	3.03
Irrigation & Groundwater	-	-	-	-	-
Tree Plantations	262	8496	73	1783	27.8
Seasonal (Prodn.)	117	49	70	42	59.8
Total	<u>445</u>	<u>14,825</u>	<u>145</u>	<u>1995</u>	<u>32.6</u>

Loans by ACF to TDA (up to 1/76):

<u>Purpose</u>	<u>Wadi Zabid</u>		<u>Wadi Mawr</u>	
	<u>#</u>	<u>Amt.</u>	<u>#</u>	<u>Amt.</u>
Farm Machinery	8	682	2	133
of Farm Development	30	183	16	96
Seasonal (Prodn.)	216	851	95	264
Total	<u>254</u>	<u>1717</u>	<u>113</u>	<u>493</u>

Loans by ACB (up to 2/77):

<u>Purpose/Branch</u>	<u>No.</u>	<u>Amt.</u>
Seasonal Loans at:		
Zabid	237	1363
Wadi Mawr	37	36
Beital Fakhi	188	646
Sana	5 ✓	2519
Tractor, pumps, Bldgs.	35	3123
Total	<u>502</u>	<u>7660</u>

Source: ACF and DCB Records

/ Includes loan to Gen. Cotton Co. & Seyhan Cooperative

3. The ACB has the power to open current or deposit accounts for individuals organizations and companies directly working in agriculture or for bodies and agricultural cooperative societies.
4. The ACB, with approval of the Council of Ministers, may borrow from the Government, the Central Bank or local banks.
5. The ACB may practice any other business normally operated by banks or agricultural credit organizations, such as marketing the agricultural and livestock products and merchandising in materials, machinery and equipment usually utilized in agriculture.

Under other articles of Law 21, common bank characteristics and functions were described. For example, the bank was to be headquartered in Sana with branch offices elsewhere in Yemen, as deemed necessary. The declared capital of the bank was 100 million Yemeni Rials contributed by the Government as 20 YR million in cash upon establishment of the bank and the additional 80 YR million to be contributed in cash within five years of the date of establishment. Hence, by 1980, the bank was to be fully capitalized. Of course, the bank remains solely owned by the Government.

The bank was asked to establish and maintain a general reserve capital fund. At the end of each fiscal year the bank was to deduct from its receipts the year's operating costs, losses due to bad debts, the consumption of assets and any other anticipated normal bank expenses. Any profits remaining were then to be transferred to the reserve fund until such time as the fund equaled in size the amount of the bank's declared capital. Once this fund reaches this level, all further bank profits are to be transferred to the Government Treasury.

Management of the ACB rests with a seven man Board of Management comprised of: 1) Chairman of the Bank; 2) Undersecretaries of the Ministers of Agriculture, Economy, Finance and Central Planning Organization; 3) Deputy Governor of the Central Bank; and 4) a seventh "non-official" member comprised of the Secretary General of the Development Cooperative Union's Federation.

The ACB was to meet its expenses from its private resources and charge service fees (interest) on the loans it makes at a "nonprofiteering" average, i.e., at an average percentage merely covering its expenditure and

assisting in the establishment of a reasonable reserve fund. Moreover, the Bank must explain in advance to every applicant for a loan what costs are chargeable on the loan so as to give that applicant a free option to withdraw the application. Those estates, lands and moveable properties mortgaged to the bank or sequestered for its interest by the Bank shall be sold in the event of the debtor's default to defray the loan within an agreed period not to exceed one year. The proceeds resulting from this sale, if they exceed the settlement of the loan and its subsequent charges, such excess shall be paid to the debtor. In all other aspects of note, the ACE functions as would any other commercial banking institution.

As of February 1977, the ACE employed a total staff of 59, 4 of whom were expatriates. Branch offices have been established in Sana, Hodafat, Beit El Fakid, Ibb, Zabid, Dahmar and Wadi Mawr.

ACB Performance Characteristics

Figures 1-3 and Tables 3-8 are designed to provide a composite of ACB performance during the brief two years of its existence. All data so provided were obtained directly from the Head Office of the ACB in Sana. Data for 1978-79 was not available.

Figure 1 is descriptive of the repayment record experienced by the ACB. As shown, a total of 2,724,944YR was due to be repaid by ACB borrowers in 1976-77. Of this amount, 2,405,103YR (or 88%) was, in fact, repaid and 319,841YR remained in arrears. During the following year a total of 11,967,022YR was due for repayment, of which only 82% or 9,327,278 was repaid. Arrears in 1977-78 totaled 2,139,144YR. Tables 3 and 4 provide a more comprehensive description of loans approved, disbursed, due and repaid during the 1976-78 period. Total number of loans approved grew from 763 in 1976-77 to 1151 in 1976-77, or over a fifty percent increase. Total loans approved (i.e., total lines of credit established) almost tripled from 13,513,382YR in 1976-77 to 36,157,240YR in 1977-78. Total loans disbursed (i.e., actual advances on lines of credit) more than tripled from 10,063,242YR in 1976-77 to 33,598,257YR in 1977-78. Hence, total advances as a percent of total loan commitments grew from 74 to 93 percent over the two year period. Loans due in each year comprised

about one-third of that year's advances. A branch-by-branch analysis provides some other interesting observations. The Sana branch advanced the largest loan in both years; however, the Hodeidah branch grew rapidly during the latter year. In 1976-77, Wadi Mawr, Wadi Zabid, Ibb, and Beit-El-Faqih branches advanced almost their full commitments, while Hodeidah advanced less than half of its commitments. A similar situation is evident in 1977-78. The underlying basis for this unique situation is unknown. Moreover, it can be seen that unutilized commitments remaining in most branches at the end of 1976-77 were, in fact, advanced during the following year. Again, however, this pattern was not true for the Hodeidah branch. Repayment percentages also vary significantly between branches. For example, Hodeidah experienced a high (92%) repayment rate during 1976/77 while Ibb failed to collect any of the 19,600 YR due that year. The following year Sana recorded the highest repayment rate (98%) and Wadi, Zabid and Mawr the lowest, at 68%. Such branch variations are not unusual, particularly as loan utilization and crop production conditions vary from region to region in a given year.

Table 5 provides us with a more in-depth understanding of the ACB performance in the area of loan repayment. On the surface, an arrears record of 12-18 percent of total loans due would seem to be alarmingly large. However, as suggested in Table 5, 87 percent of the total arrears were collected within six months of their date due. Arrears exceeding six months past due totaled only 319,840YR in 1978, or just over 2 percent of the total amount due. This may be compared to a delinquency rate for agricultural loans in the U.S.A. which averages just under one percent for commercial bank performance.

Figure 2 depicts the ACB loans approved by branch locations for 1976-77 and 1977-78. As noted earlier, the Hodeidah branch grew most rapidly in the volume of loan commitments (but as noted, only about half of these commitments were advanced). It appears that Sana will remain the largest branch operation while Zabid, Dalmar, and Wadi Mawr remain much smaller. Table 6 provides additional information regarding the number of borrowers by branch.

The largest proportionate growth in the number of borrowers was experienced by Hodeidah. It is interesting to note that Wadi Zabid and Mawr added few new borrowers to their program during the second year of operations. This, alone, would explain the near status level of total loans approved by the two branches over the two year period.

Figure 3 describes loan utilization by type or purpose during 1976-77 and 1977-78. Quite obviously, the purchase of agricultural machinery is the common purpose for which ACB loans are approved. Poultry projects, production (fertilizer) loans, and land development are of lesser importance. Interestingly enough, cotton loans are the only loan type which diminished in importance over the two year period. This is consistent with a dramatic decline in cotton production during this period due to depressed prices and an institutionalized cotton market.

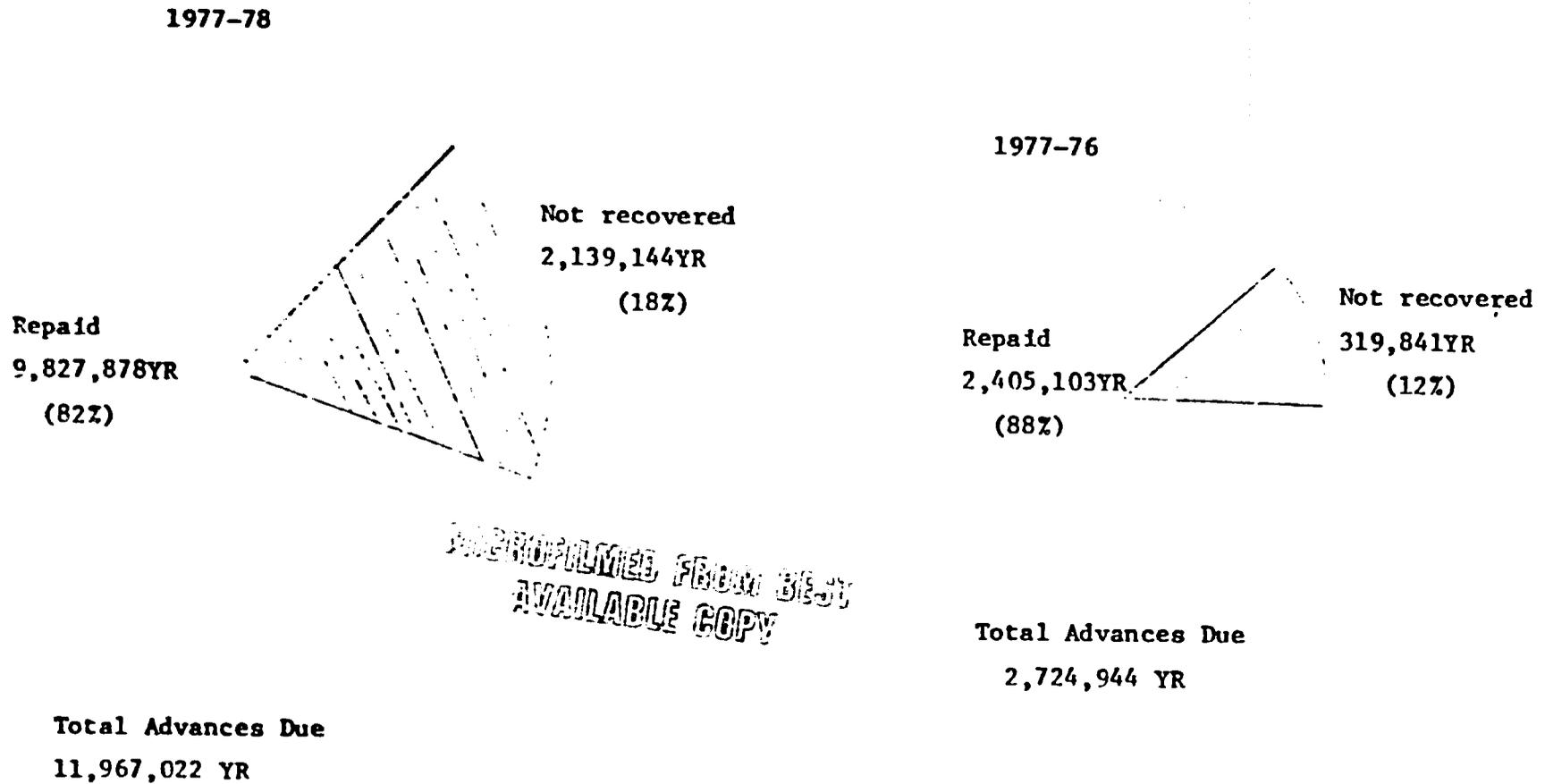
Table 7 provides some insights into the magnitude of loans approved by purpose. Other than a single large loan for transportation, poultry loans were the largest, averaging 429,961YR each. Loans for tractors and machinery averaged 77,990YR while those for land reclamation ranked third largest, averaging 53,582YR.

Table 8 summarizes the ACP loan terms, rates, purposes and collateral requirements. Short term production loans are to be repaid within 1 year and assessed a 7 percent interest rate. A crop loan is required as collateral. Medium term loans for equipment and buildings are repaid in 2-5 years, assessed a 6% interest rate and secured with a real estate mortgage. A long term loan package is described, but ACB officials explain that such loans have not yet been implemented by the ACB.

Agricultural Credit Restrictions and Deficiencies

In view of its infancy and its rather diverse origin, it should not seem surprising that agricultural credit in Yemen is seriously restricted in the breadth of its services and deficient in the quality of those services offered. Time, experience and a further broadening of its financial base will, no doubt, solve many of the existing problems associated with providing those rural credit services needed to fulfill the requirements of an expanding agricultural economy. Nonetheless, this

Figure 1. ACB Loans Advanced and Repayment Record
1977-1976 and 1977-1978



*Source: ACB Records

Figure 2. ACB Loans Approved by Location*

1976-1977

1977-1978

Total

36.15 YR million
13.52 YR million

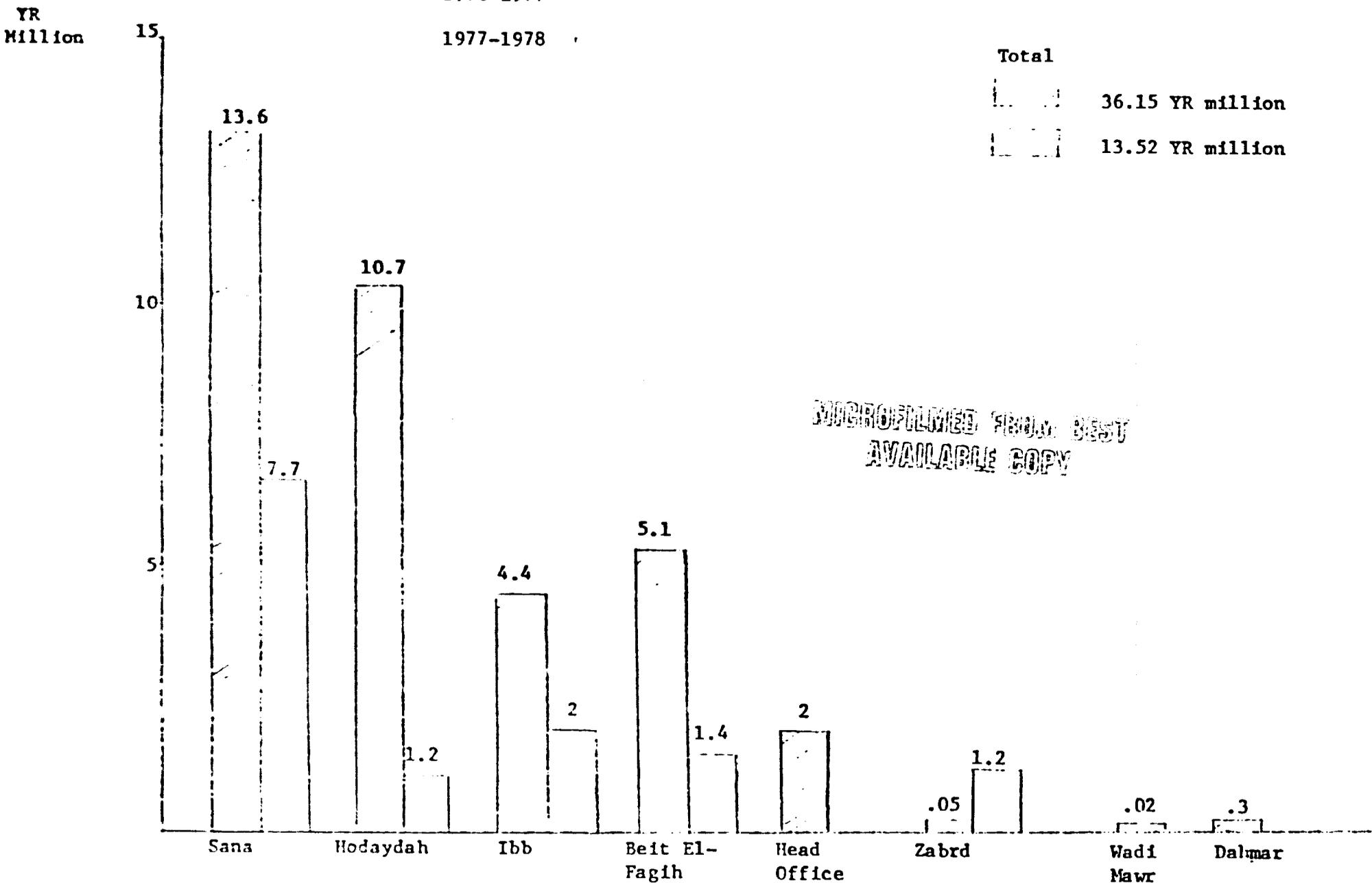


Figure 3. ACB Short and Medium Term Loans Approved by Type or Purpose*

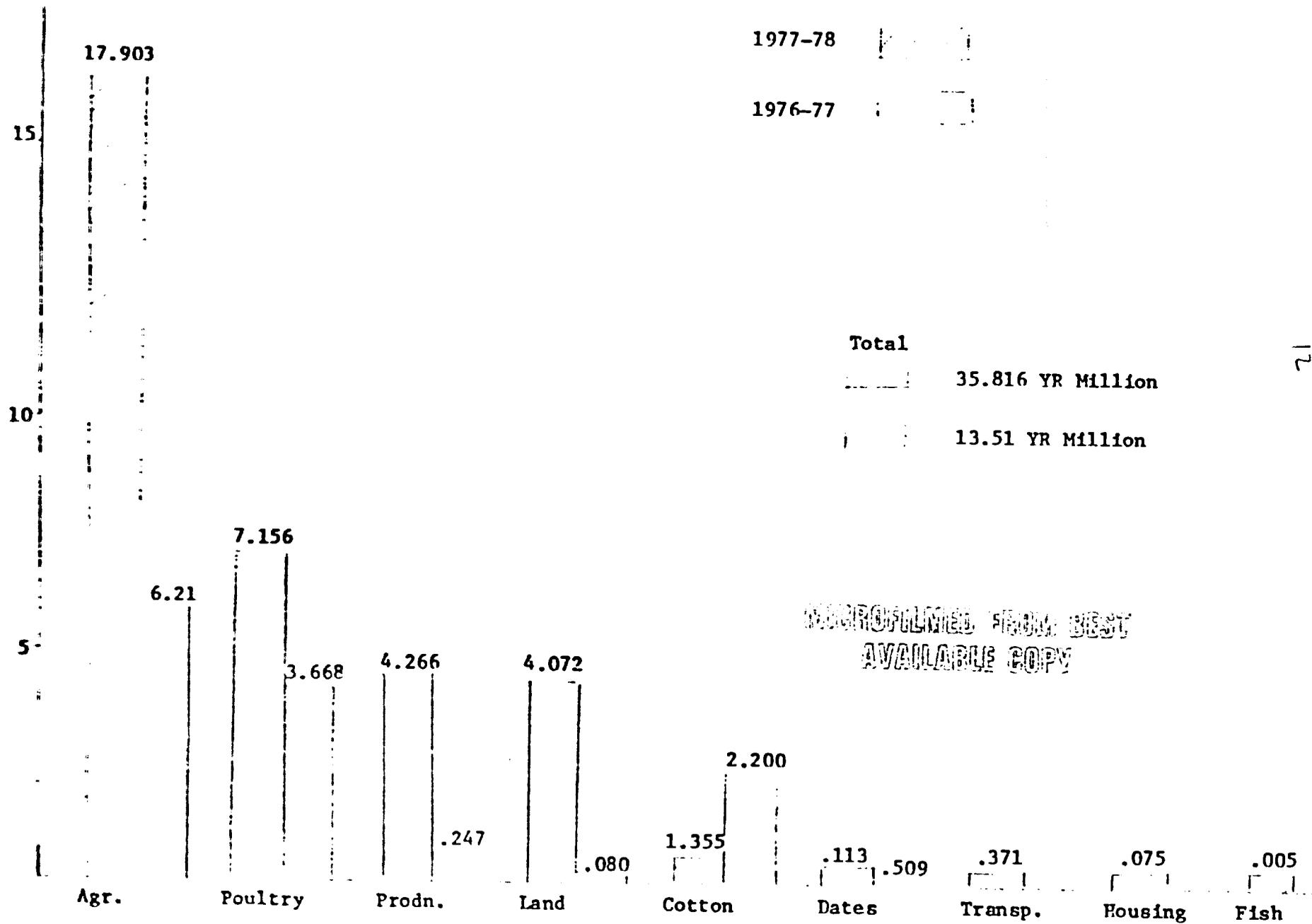


Table 3

LOANS APPROVED, DISBURSED, DUE & REPAID - ACB 1977-78

<u>Branch</u>	<u>Loan #</u>	<u>Approved Amt. YR</u>	<u>Loans Dispersed Amt. YR</u>	<u>Loans Due Amt. YR</u>	<u>Loans Repaid Amt. YR</u>	<u>Percentage of Repayment</u>
Sanaa	125	13,583,016	15,796,624	2,968,206	2,901,796	98.07
Hodeidah	244	10,699,497	5,826,877	2,644,351	2,022,263	78.74
Ibb	56	4,363,214	4,248,889	1,554,074	1,290,415	83.03
Feit El Faqid	716	5,087,513	5,347,866	2,660,341	2,074,762	77.99
Zabid	2	58,000	58,000	105,739	72,398	68.47
Wadi Maur						
Head Office	<u>2</u>	<u>2,000,000</u>	<u>2,000,000</u>	<u>2,034,309</u>	<u>1,406,242</u>	<u>69.13</u>
TOTAL	1151	36,157,240	33,598,257	11,967,022	9,827,878	82.13

Table 4

LOANS APPROVED, DISBURSED, DUE & REPAYED - ACB 1976-77

<u>Branch</u>	<u>Loan #</u>	<u>Approved Amt. YR</u>	<u>Loans Dispersed Amt. YR</u>	<u>Loans Due Amt. YR</u>	<u>Loans Repaid Amt. YR</u>	<u>Percentage of Repayment</u>
Sanaa	56	7,721,611	5,067,141	866,538	748,188	86.34
Hodeidah	39	1,206,764	594,310	2,900	2,679	92.38
Ibb	27	1,983,000	1,954,625	19,600	-	-
Beit-El-Faqih	368	1,400,897	1,245,996	598,251	530,295	88.64
Zabid	237	1,179,630	1,179,630	1,237,654	1,123,940	90.81
Wadi Hawr	36	21,480	21,480			
Total	7763	13,513,312	10,063,242	2,724,944	2,405,103	88.26

Table 5

SUMMARY OF ACB LOAN REPAYMENTS
(6/30/1978)

<u>Descriptions</u>	<u>Amount YR</u>	
Loans Approved (since commence- ment to 6/30/78)	<u>49,670,622</u>	
Amounts Due for Payment 6/30/78	14,691,966	
Amounts Collected 6/30/78	<u>12,232,982</u>	
Arrears	2,458,984	
 <u>Arrears Composition</u>		<u>Percent</u>
Arrears Less Than 6 Months	2,139,144	87
Arrears More Than 6 Months	319,840	13
Ratio of Over 6 Months to Total Amount Due		2.2

Table 6

ACB LOANS APPROVED AND NUMBER OF BORROWERS

(1976-77 and 1977-78)

Branch	Year 1976-77		Year 1977-78		Total	
	# Borrowers	YR Million	# Borrowers	YR Million	# Borrowers	YR Million
Sana'a	56	7.122	125	13.583	181	21.305
Hodeidah	39	1.207	244	10.699	283	11.906
Beit Al-Faqih	368	1.401	716	5.088	1084	6.489
Ibb	27	1.983	56	4.363	83	6.346
Head Office	-	-	2	2.000	2	2.000
Wadi Zabid	237	1.180	2	0.058	239	1.238
Dhamar	-	-	6	0.366	6	0.366
Wadi Mawr	36	0.021	-	-	36	0.021
Total	763	13.514	1151	36.157	1914	49.671

Table 7

DISTRIBUTION OF ACE LOANS BY PURPOSE
(1977-78)

<u>Purpose</u>	<u># Loans</u>	<u>Amount - YR</u>	<u>Average Amount</u>
Tractors & Equip.	136	10,606,733	77,990
Pumps	213	7,319,415	34,363
Land Reclamation	76	4,072,286	53,582
Poultry	17	7,156,350	420,961
Cotton	65	1,355,475	20,853
Seasonal	406	4,266,086	10,507
Means of Transp.	1	378,000	378,000
Dams	235	922,895	3,927
Rural Housing	1	75,000	75,000
Fisheries	1	5,000	5,000
Total	1151	36,157,240	31,413

Table 8

ACB LOAN TERMS, CONDITIONS, PURPOSES *

<u>Term</u>	<u>Years Repayment</u>	<u>Annual Interest Rate</u>	<u>Purpose</u>	<u>Collateral</u>
Short	1 Year	7	Crop Prodn. & Personal	Crop L n
Medium	2-5 Years	6	Equipment & Bldgs.	Mortgage on Bldg. & Equip.
Long	6+ Years	6	Land	Mortgage on Land

*Source: ACB Records

general assessment of the current state of agricultural credit would be incomplete were the following comments to be omitted.

The first major restriction affecting agricultural credit in Yemen is the continued existence of a religious taboo against the assignment of an interest rate. While I have no desire to pass judgment on the religious doctrine, it must be acknowledged that commercial credit, within a free enterprise economy, cannot endure without some direct compensation for the time value of money. To the extent that so-called service charges provide the compensation is highly speculative. At the very least, such charges appear illusory, inequitable and arbitrary. It is doubtful that those borrowers of commercial credit are fully aware of the service charge impact on the true cost of debt. Within such an environment, borrowers are unable to intelligently select from amongst alternative sources of debt capital. Finally, if the national banking infrastructure lacks an explicit and competitive interest income, its ability to raise investment capital in the world is severely limited. To date, this reality has been lessened by the large scale underwriting of development programs by Yemen's oil-producing neighboring nations. Such external support is both admirable and necessary. However, it does render rather speculative the long-range credibility of an internally self-sufficient agricultural credit system.

Current land tenure patterns provide the second major restriction imparting agricultural credit. While the bulk of Yemen's agricultural land is found within the private sector, average farm size (also field size) is small and becoming smaller as Islamic law spreads an estate equally amongst the male, and less equally amongst the female, heirs. As average farm size becomes smaller and as other marginal farm land is abandoned due to lack of labor, the farming unit becomes less economically viable and less able to incorporate efficiently modern technological improvements. While such technology is needed by the farmer to compensate for labor shortages, he does not possess the operational viability needed to qualify for an agricultural loan which would have facilitated the technological adaptation.

A third restriction imposed on agricultural credit is the general Yemeni reluctance to mortgage land as security for a loan. Land itself is viewed as an inseparable part of the family unit. To mortgage such an asset is sometimes interpreted as having placed a pending threat to the future security of the family. Such a deep and widespread reluctance prohibits the issuance of long term agricultural loans. Without long term debt capital, the agricultural economy is limited in its ability to accomplish the land ownership consolidations needed to create more economically attractive farming units. Again a vicious circle of inter-dependent deficiencies arises.

An agricultural credit deficiency specifically linked to the ACB is its apparent low level utilization of the existing funding base. The bank is currently capitalized by the YARG at 90 million YR. During 1977-78, it operated on a funded capital base of 80 million YR and it is expecting to reach its fully capitalized position by 1981. However, based on 1978 capitalization of 80 million YR, only 49 million YR worth of lines of credit had been established. An even lesser amount had actually been advanced to agricultural borrowers. Even allowing for a reasonable reserve fund requirement of perhaps ten percent of the total loan balance outstanding, this suggests a very low level of funds utilized by the ACB. Quite frankly, it is unknown whether such performance is the result of insufficient demand or an abnormally high set of acceptance standards established by the bank.

A less visible, but no less significant restriction affecting agricultural credit in general, and ACB operations in particular, is the depressive effect that general price inflation has on debt capital availability. For example, as general inflation (and land prices) rises at 20-30 percent per year, the ACB maximum capitalized capacity to fulfill agriculture's debt capital needs is reduced each year proportionately. If general price inflation continues at its current pace, and if the ACB reaches a full and fixed total capitalization of 100 YR million in 1981, the "true" lending capacity of the bank will approximate only about 33 percent of that envisioned at the time of its origin in 1976.

Inflation is also linked indirectly to this next agricultural credit restriction in that inflation establishes the minimum true cost of the

time value of money. More simply, capital not invested this year will be capable of purchasing 20-30 percent fewer real goods and services one year from now. Therefore, as the general price inflation exceeds the prevailing interest rates, returns to debt capital investments become negative. At the current ACB interest rate (service charge) level, it should not be surprising that deposits and investments by cooperatives and agribusiness-related enterprises have been negligible. Within such an environment there exists a contraproductive incentive to "overborrow" whenever possible, i.e., the purchasing power of capital is dropping more rapidly than the penalties associated with obtaining such capital in the form of debt. These theoretical commiserations can, of course, become highly illusory. It remains notable, however, that while world capital markets currently call for a 10-14 percent rate of interest (or discount), and while Yemen's economy is suffering from a high rate of inflation, agricultural credit interest rates are fixed at the 7-8 percent level.

A further deficiency of the current agricultural credit system is its inability or reluctance to loan money directly to cooperatives. It must be acknowledged that many cooperatives operate with minimal assets and real property. It must also be acknowledged that failures have been experienced by the ACE in its attempt to service cooperatives directly. Nonetheless, cooperatives very often represent the only operational infrastructure at the local level through which the consolidated activities of many small farmers can achieve an economically viable level of activity. Without such organizations, the credit worthiness of each of their farmer-members, separately, is doubtful. As a consolidated unit, the cooperative may provide the only vehicle through which debt capital can be provided and secured. The longterm success of such a credit policy will not rest on the magnitude of collateralized assets, but rather on the wisdom, honesty and managerial talents of the comparative leaders. This latter point must be incorporated into ACE philosophy if agricultural cooperatives are to be sustained and fostered in Yemen.

It had been earlier noted that the ACB has not, to date, extended a significant amount of long-term debt. Its performance here is, no doubt,

linked to farmer reluctance to mortgage land and the fact that a true market for agricultural land rarely exists at the local level. While these two factors do constitute understandable barriers to an entry into the market for long-term debt, it must also be acknowledged that until some form of land consolidation is facilitated and financed, improved production efficiency for Yemen agriculture will be forever suppressed.

We must also acknowledge a deficiency in the ranks of personnel supporting the present agricultural credit system. For those experienced and trained in finance and credit, Yemen must seek and employ numerous expatriates. In so far as the ACB evolved from within the YARG, it is truly a "national" bank. As such, it would seem a desirable goal to employ a high proportion of Yemenis whenever possible. That additional training is needed by the existing personnel is evidenced by the facts that banking procedures continue to employ personal entries, handwritten documentation, and inefficient labor-intensive auditing procedures. In addition to being well-trained in financial management, bank personnel, particularly those employed in the branches, should also possess a basic understanding of Yemeni agriculture, its financial needs and operational characteristics.

There has already been an explicit recognition that Yemen can ill-afford the inefficiency associated with a duplication of services by the ACF and ACB. The ACF services are restricted to the IDA programs and their level of loan acceptance has been alarmingly low. My analysis would support the YAPG plan to merge the ACF into the ACB. However, despite the existence of a so-called merger plan, few persons are aware of its content or time schedule and, to date, the merger remains incomplete. It is unknown whether this delay is: 1) intentional, 2) the result of second thoughts or hesitations on behalf of bank management, 3) political complexities, or 4) the inability of system personnel to accomplish those tasks precedent to the consolidation.

One final remark or observation also seems warranted. While this is admittedly a subjective judgment, I perceived a sense of ultraconservatism amongst the professional attitudes of those with whom I visited at the ACB. Loan failures were described as if they reflected personally on the

characters of the bank personnel involved. It was obviously interpreted as a near personal insult to have, in any way, participated in a loan failure. Given such an environment, if it is as pervasive as I suggest, loan decisions can be cast within such rigid constraints that the services offered no longer meet the needs of agriculture. While the ACB rate of loan default is high by U.S. standards, for a nation in the midst of rapid economic development, this would seem to be unnecessarily low. Such is the end-product of an overly conservative banking environment.

Additional Observations and Limitations

Agricultural credit in Yemen is still in its infancy. Under the proposal to merge the Agricultural Credit Fund into the Agricultural Credit Bank, the ACB would remain as the single most important source of credit for farmers. Yet the ACB has only 3 years of operating experience and is not yet in a position to address the needs of the smaller farmer, particularly the tenant farmer. Although there is an existing non-formal credit infrastructure, very little is known about it and no data are available. What is known is that if a farmer is forced to negotiate credit with a seller of farm equipment, fertilizer, pumps, etc., the seller will inflate the selling price to compensate for what would otherwise have been a substantial interest charge. It is also known that some larger farmers secured debt capital directly from the Yemen Bank for Reconstruction and Development. However, as now designed, the ACB is to supplant this prior source. It should be noted that Yemen is unique in that the bulk of its financial resources reside within the private sector and are fairly evenly distributed. A further complication revolves around the remittances and their impact on the capital base of rural Yemen.

All credit operations, in their current state, are constrained by the lack of qualified personnel and a mechanical accounting system which is still fully reliant on manual entries. The actual credit needs of Yemen farmers were likely not being fulfilled by the limited loan categories as established for the IDA projects operating through the ACF. Nor could Yemen afford the duplicative efforts of both the ACF and the ACB. Hence, it seems wise that the Government is now seeking a means for merging the two institutions.

The land tenure and social conditions in Yemen will no doubt require specially adapted credit procedures - procedures which are not now available through the ACB. Most farms are small and many are tenant-operated. To further complicate matters, there exists a general conviction amongst rural people that land should not be mortgaged or issued as security for loans. Even the existing pattern of land ownership and share-cropping arrangements may deteriorate over time as Islamic law calls for the equal distribution of estate lands amongst male descendents. Under this system, farm size become even smaller and tenant farming increases. Within this environment it is, therefore, essential that credit institutions find ways to extend credit within a rather complex land tenure system. It has been suggested that the establishment of farmer credit cooperatives at the local or sub-district level might fulfill this need.^{1/} Unfortunately, current ACB experience with the use of cooperatives as pass-through vehicles for production credit has not been satisfactory, e.g., the funds were distributed by the sheikh to his cooperative members, but as the members repaid the debts the funds were retained by the sheikh rather than used to repay the ACB.

Further constraints revolve around the fact that the present land tenure practices do not provide for the tenant any incentive or a means by which to adopt more productive practices such as the purchase of labor-saving equipment or the use of chemical fertilizers. And, as farm size becomes even smaller, it becomes less feasible to adopt such practices. In some cases, the traditional 50/50 sharing of crop receipts and production costs between tenant and land owner has been adjusted to facilitate and encourage improved practices. The degree to which such adjustments have proven successful is yet unknown. As such adjustments are made, however, it would seem wise that the traditional "verbal" agreement between tenant and landowner become a written "formal" agreement whereby the assurance of tenant security, the length and terms of tenancy, and the adjustment measures be explicitly recognized.

^{1/} "Yemen Arab Republic, Development of a Traditional Economy";
A World Bank Country Study, January 1979, pp.103.

As a final note, it has been suggested by some observers that agricultural credit currently has a "zero opportunity cost". It is argued that remittances have now provided farmers with a quasi form of excess disposable income. Once their basic consumer goals have been met, farmers are at a loss as to how to most effectively spread remaining funds on agricultural interests. It has been noted that within this setting, tractors are purchased which are much too large for the farmer's need, equipment is secured which is inappropriate for terrace cultivation and fertilizer is obtained with little knowledge of its quality or the soil requirements.

I find it difficult to accept the argument for a zero opportunity cost for agricultural credit, particularly as remittances are not evenly distributed throughout Yemen, nor do they represent a guaranteed sustainable source of future funds. I do, however, acknowledge that agricultural credit will have to be extended with the greatest precaution and assurances that the debt capital be used by the borrower in the most technologically effective and economically efficient manner.

Law No. 21 of 1975
Concerning the establishment,
constitution and powers
of the Agriculture Credit
Bank

In the name of the people,
Chairman of the Command Council,
After taking note of the Constitution,
And the Command Council Statement No. 1 of 1974
And the Constitutional Declaration of 22nd October, 1974,
And following the approval of the Council of Ministers
and the Command Council,
And after the assent of the Consultative Assembly to the
following Law hereby enact:

Section 1

Introduction

Article 1: This Law shall be named the Agricultural Credit Bank Law.

Article 2: For the purpose of this law the following words laid down herein, bear special definition as mentioned below, unless the context indicates otherwise:

- (a) Bank: The Agricultural Credit Bank established under this Law.
- (b) Yemen: The Yemen Arab Republic.
- (c) Government: The Government of the Yemen Arab Republic.
- (d) Board: The Board of Management of the Agricultural Credit Bank.
- (e) Minister: Minister of Agriculture.

Section 2

Constitution & Powers of the Bank

Article 3:

(a) A Bank called the Agricultural Credit Bank shall be established in the Yemen Arab Republic to carry out the work provided for in this Law.

(b) The Bank enjoys the status of a legal person of financial and administrative autonomy and has a special seal of its own.

(c) The Bank has the following powers:

- i) to make loans for financing agricultural enterprises and operations relating thereto with the aim of developing agriculture, irrigation and forestry and contributing to the promotion of agricultural and livestock production in the country, and, encouraging and supporting the agricultural cooperatives within the framework of the State general policy also, improving and establishing agrarian and livestock industries.
- ii) to litigate on its own as plaintiff or defendant or retain in the course of carrying out legal proceedings relating to its work or to any other purposes the Attorney General or any other person.
- iii) to open current or deposit accounts for individuals, organizations and companies directly working in agriculture or for bodies and agricultural cooperatives societies.
- iv) with approval of the Council of Ministers to borrow from the Government, the Central Bank or local banks.
- v) to practise any other business normally operated by Banks or agricultural credit organizations such as marketing the agricultural and livestock products and merchandizing in materials, machinery and equipment usually utilized in agriculture.

Article 4: The Bank headquarters shall be set up in Sana and may have branches or offices in Yemen whenever it is deemed appropriate by the Bank.

Section 2

Capital, net profits and reserves

Article 5:

(a) The declared capital of the Bank is One Hundred Million Yemeni Rials contributed by the Government and is payable as follows:

- i) Yemeni Rials Twenty Millions in cash on establishment.
- ii) Yemeni Rials Eighty Millions within five years from the date of establishment.

(b) The Bank may on the Board's decision and subject to the approval of the Council of Ministers and the Consultative Assembly increase or decrease the declared capital to the limits it deems necessary.

(c) The Government solely owns the full capital of the Bank.

Article 6:

(a) The Bank shall set up and maintain a general reserve capital.

(b) At the end of each fiscal year and after deduction of the year's expenditure, the dead and bad debts, the consumption of assets and any other anticipated normal Bank expenses the Board shall transfer the net profits to the Bank general reserve account till the amount deposited in this account equals the Bank's declared capital.

(c) After covering the general reserve capital as provided for in the second clause of this same article the net profits shall be transferred to Government Treasury.

Section 4

Administration

Article 7: The Bank shall be comprised of:

- (a) Board of Management
- (b) Director of the Bank
- (c) General Manager
- (d) An Executive Body

Article 8: The Board of Management shall be comprised of six official and one non-official members as under:

1) Official members:

- (a) Director of the Bank (as Chairman)
- (b) Permanent Under Secretary of the Ministry of Agriculture
- (c) Permanent Under Secretary of the Ministry of Economy
- (d) Permanent Under Secretary of the Ministry of Finance
- (e) Permanent Under Secretary of the Central Planning Organization
- (f) Deputy Governor of the Central Bank

(as members)

The Director of the Bank is appointed by a Command Council decision on approval of the Council of Ministers of a proposal made by the Minister.

ii) Non-Official member:

The Secretary General of the Development Cooperative Unions Federation shall be the non-official member of the Board.

Article 9: Duties and powers of the Board are as follows:

- (a) to lay down by-laws and regulations of the Bank
- (b) to sanction the administrative framework (skeleton) of the Bank
- (c) to approve of the establishment and cancellation of branches and offices
- (d) to approve of drawing loans from the Government or any other authority or organization on terms specified by the Council of Ministers and the Consultative Assembly
- (e) to sanction any settlement resulting in any profit or loss to the Bank
- (f) to recommend any amendment to the provisions of the Bank Law, and subsequently approve of any amendments to the regulations issued thereunder
- (g) to scrutinize and approve of the Bank budget
- (h) to approve of transfer warrants from one budgetary item to another
- (i) to sanction the Bank general budget, annual terminal accounts and the transfer of net profits as provided for in clauses 2 and 3 of article 7 of this Law (note: This should surely read in clauses b and c of article 6 of this Law)
- (j) to specify the percentage of service fees chargeable on loans as provided for in article 14 of this Law
- (k) to specify the moveable and immoveable properties, crops, bonds and shares of commercial and agricultural companies and other things acceptable as surety for the loans credited by the Bank, also to lay down the terms appropriate for such transaction
- (l) in consultation with the Central Bank of Yemen appoint other banks in which to deposit its funds and to lay down the terms of distribution of those funds among those banks
- (m) to specify the principles governing the crediting transactions conducted by the Bank, also those for collection of funds to lay down

the conditions ensuring the expenditure of loans granted by the Bank for productive agrarian purposes and to ensure through the Bank officers in charge of execution and control the investment of these loans in agricultural operations

- (n) to look into any other matters put on agenda by the Director of the Bank for deliberations of the Bank.

Article 10:

(a) The Board convenes under the chairmanship of the Director of the Bank and a quorum is formed by four members of the Board. Resolutions are passed by absolute majority of the present members and in case of a tie the side comprising the Chairman's vote shall be preponderant. In the event of the Director's absence from the Board meetings the Permanent Under-Secretary to the Ministry of Agriculture shall take the chair.

(b) The Board convenes on the behest of the Director once every three months - at least - and whenever necessitated by the Bank business or on request of three Board members.

(c) The Board shall convene within ten days from the date of delivery of an application to that effect to the Director by three members of the Board.

(d) The Board meetings shall be held on prior notification according to by-laws laid down by the Bank.

Article 11:

(a) The Director of the Bank is the Supreme Head of the Bank and of its executive body and is responsible for the implementation and execution of the policy laid down by the Board in the manner that ensures the achievement of its aims herein provided for and in any other regulations issued thereunder. In general the Director shall be responsible for all matters relating to the Bank not herein explicitly vested in the Board of Management. The Director may delegate any of his authorities to the General Manager and any other officers of the Bank.

(b) 1) The General Manager with the assistance and supervision of the Director shall administer the Bank's business and exercise the authorities necessary for the smooth running of the business of the Bank - and its branches. He may delegate any of his authorities to any of the Bank officers.

ii) The General Manager shall be appointed by the Board of Management on nomination by the Director.

c) Neither the Director nor the General Manager shall be permitted to be member in any Board of Management of any commercial or agricultural organization or expert therein save in an institution subject to the Bank administration or wherein the Bank is share holder or where it is subject to Government administration or supervision.

Article 12:

(a) The Director and the General Manager shall be appointed for a period of four years renewable. Both shall retain their posts during their official tenure unless in case of death, resignation, vacation or deposition.

(b) The salary, remuneration and allowance of the Director shall be resolved by a Command Council decree after approval of the Council of Ministers.

(c) The Director and the General Manager shall be qualified and experienced in financial and either agricultural, economic or legal fields.

(d) Selection and appointment of the Bank personnel and their terms of employment, specification of their salaries, rights etc. shall be effected within a special system laid down by the Bank.

(e) The Bank may initiate a savings account arrangement for the employees.

Section 5

Accounts

Article 13: The Bank fiscal year shall be identical to that of the State and its accounts shall be closed at the end of each fiscal year.

Article 14: The Bank fiscal year shall carry out its business on a commercial basis, meet its expenditure from its private resources and charges service fees on the loans it makes at a non-profitmaking average i.e., at an average (percentage) merely covering its expenditure and realising a reasonable reserve fund. The Bank shall explain in advance to every applicant for a loan what costs are chargeable on the loan so as to give free option to the applicant.

Article 15: The Bank shall maintain an account system and records complying with the principles of normal modern commercial accountancy and, those records shall be subject to annual auditing by an approved auditing organization and shall be sanctioned by the Minister. Besides, Bank accounts shall be subject to internal auditing.

Section 6

General Provisions

Article 16:

(a) The Government shall stand as absolute surety to all the Bank liabilities.

(b) The Government shall make arrangements for the security of all the Bank premises all over the Yemen Arab Republic and shall deploy all means necessary for watching them and provide body guards necessary for the Bank personnel while they carry out their official duties.

Article 17: The Bank funds and right shall be considered as those of the State and the Bank shall be entitled to request that its funds be collected under the Collection of Public Funds Law. The Bank shall have the right to sell the moveable and immovable properties of debtors and their guarantors through all legal methods.

Article 18: In each case whereby a pecuniary warranty on a debtor is given, whatsoever may be the loan credited by the Bank, the warrantor is considered fully and jointly responsible as the original debtor to settle the debt even though the warranty document did not include any provision to that effect.

Article 19: The Bank shall not own lands or buildings except what it needs for running its administrative work. The estates, lands and moveable properties mortgaged to the Bank or sequestered for its interest by the Authorities shall be sold in the event of the debtor's default to defray the loan within an agreed period not exceeding one year and the proceeds resulting therefrom shall be remitted to the Bank account in settlement of the loan and its subsequent charges, and if the proceeds exceed the required settlement amount the excess shall be paid to the debtor. On the

other hand, if the proceeds fall short of the amount due the deficit shall be retrieved from the debtor and the warrantor who are mutually responsible.

Article 20: The Bank shall be exempted from income tax and any other taxes or fees save those levied by Customs Department.

Article 21:

i) Properly authorised officers of the Bank are legally responsible for organizing the loan bonds, insurance or mortgage and the special terms related thereto and for hearing the debtor's declaration or that of the warrantor whenever such warrantor is deemed necessary. The documents and bonds organized by them shall be legally valid and unchallengeable in registration departments etc.

ii) Loan bonds shall have the strength of these vouchers to be honored on short notice.

iii) Competent authorities shall without attendance of the debtor or warrantor impose the mark of "Surety", "mortgage" or "sequestration" on the registration of immoveable properties owned by the debtor or his warrantor on request of the Director of the Bank or one whom he deputed or by the Branch Manager. This mark shall be lifted on a written request made by the Director of the Bank or one who he authorises to act on his behalf. The Bank transactions shall have the priority of registration with competent departments. The mark "surety" "mortgage" or "sequestration" shall be lifted from the debtor's and warrantor's properties immediately the debt is settled.

Article 22: The Bank has the right to request advice and assistance of the Government Officers and experts in connection with its business. It is also entitled to ask assistance of experts whomsoever. All the Ministries, Government Departments and Authorities as well as the public organizations subject to Government supervision shall cooperate with the Bank.

Article 23: All damage caused to moveable and immoveable properties in possession of a debtor and secured by way of mortgage or insurance or sequestered by way of compulsory execution shall be to the debtor's account.

Article 24: The Bank has for the purpose of setting back its due funds the right to post guards for sequestration on the crops of the debtors whose readiness to defray due funds on certain due dates is doubted by the Bank, whether or not those crops were mortgaged:

- 1) If sequestration is imposed after due date the amount due shall be collected and the charges borne by the Bank shall be to the debtor's account.
- ii) If sequestration is imposed prior to due date the charges spent up to due date shall be to the Bank account provided the debtor has paid the amount in question by the due date and if no payment is made all charges shall be to the debtor's account.

Article 25: No Government authority, whatsoever, is entitled to give instructions to the Bank on the question of giving grants, aids or loans or to waive its debts claims.

Article 26: The Bank is prohibited from giving any grants or awards be they in kind or in cash.

Article 27: The Bank shall embark on its lending transactions from 1st July, 1976 initially to those enterprises whose economic advantages have been established and shall thereafter gradually expand the scope of its activities to cover the sorts of loans herein mentioned for a period of five years.

Article 28: The Board of Management shall formulate the rules necessary for achieving the aims of this Law preparatory to forwarding them to the Council of Ministers for sanction.

Article 29: The Agricultural Bank Law No. 2 of 1971 and any other Laws or provisions conflicting with the provisions of this Law shall by this be cancelled.

Article 30: This Law shall come into effect from date of its issue and shall be published in the official gazette.

CHAIRMAN OF THE COMMAND
COUNCIL

MEMBER OF THE COMMAND
COUNCIL AND PRIME
MINISTER

MINISTER OF
AGRICULTURE

C.I.D. SUPPORT PAPER NO. 3

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YEMEN'S EXPORTS, IMPORTS, AND BALANCE
OF TRADE

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and

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YEMEN'S EXPORTS, IMPORTS, and BALANCE OF TRADE

In comparison to the volume of its physical imports, Yemen's exports are almost insignificant. Indeed, Yemen's exports totalled only 84 million YR in 1976-77. While this was a doubling of the 1971-72 level of exports, they comprised only about three percent of the imports that same year. Table 1 illustrates quite dramatically the extent to which Yemen is a net importer of goods and services. Imports grew only gradually from 433 million YR in 1971-72 to 873 million YR in 1973-74. For the next three years, however, imports grew more rapidly and reached 3,284 million YR by 1976-77. Of this total, only 10 percent, or 292 million YR, comprised government imports. Private imports had, in fact, expanded by 860 percent between 1971-72 and 1976-77. By 1976-77, a negative trade balance of 3200 million YR existed.

Quite obviously, such a lopsided trade balance would not be sustained long were it not for some compensating funds flow. In fact, this compensation has appeared in the form of a unique type of Yemen export--emigrant labor. It is estimated that as many as 400,000 Yemen citizens have emigrated to Saudi Arabia and other Arab oil-producing nations to find temporary employment. Much of their earnings are returned to Yemen as remittances and subsequently used by their families to purchase the rapidly growing volume of imports. Remittances alone grew from 328 million YR in 1971-72 to 4,561 million YR in 1976-77 and more than fully offset the nation's negative trade balance. If one considers additional inflows of funds into Yemen resulting from grants and net additions to official loans, and if you also consider other capital generated from commercial loans, Yemen's trade reserves have grown during each of the past six years. In 1976-77, alone, trade reserves grew by over 2,000 million YR. In brief, Yemen has become an importer of goods and services, particularly food products, and an exporter of labor. As long as the latter exceeds the former, a positive trade reserve will exist and grow. This situation will likely continue at least in the short run, despite Yemen's historical record of a negative balance of trade.

Food Imports

Table 3 describes the diversity of food imports in Yemen during 1977-78. As shown, many foods in their many forms are being imported and consumed by Yemen residents. In an attempt to assess the major categories of food product imports, I have calculated what percent each commodity import is relative to the value of all food imports. Table 4 provides a more precise listing of the major food imports by commodity. As shown, Durham wheat accounts for largest value of food imports, or 241,355,000 YR. Poultry, meat and refined sugar rank second and third respectively, followed by fruit and vegetable juices, cigarettes, tea, milk and cream, and wheat flour. Totally between 40 and 50,000,000 YR in value of imports are such commodities as margarine, fresh apples, birds and eggs, prepared fruit and nuts, rice, oranges and bananas.

As the value of these food imports grows each year, Yemen becomes ever more dependent on externally supplied foods and less self-sufficient of its own total food requirements.

If Yemen sought to reduce its dependence on externally produced foods, the list in Table 4 would comprise the commodities which should be assessed for increased domestic production. Much of Yemen, particularly the Tihama, is not suitable for wheat production. In the higher elevation areas where wheat could be produced, it would have to supplant sorghum. Since sorghum in Yemen is a higher yielding and multiple use crop compared to wheat, such a substitution would seem unwise. The increased production of poultry, birds, and eggs has real potential in Yemen, particularly as the availability of sorghum-base feedstuffs increases. It is speculated that sugar beets could be produced in some parts of the Tihama. The sandy soil conditions are conducive to sugar beet growth and the availability of irrigation water becomes the only major restraint. Those marginal lands in the terraced areas of the heavy-rainfall mountains could be used to grow tobacco and tea. The production of such tropical fruits as bananas and oranges is also possible in the Tihama. Hence, as one reviews the listing of major food imports, it is not unreasonable to presume that agricultural development in Yemen could contribute much to a future decrease in this nation's dependency on externally produced foods.

Imports by Source

As an interesting supplemental analysis, we have elected to evaluate Yemen's major food imports by their source. Table 5 takes the 15 largest value food imports and lists those nations which provide the larger share. For example, Yemen's poultry meat imports originate in large part in France and Holland, while Holland and Germany provide most of the preserved milk and cream. Australia truly dominates the Yemen import market for Durham wheat, but birds and egg imports are more equitably spread amongst Saudi Arabia, Lebanon, U.S.A., and Greece. Strangely enough, Djibouti and U.S.A. provide the bulk of imported rice. Saudi Arabia provides the major share of such fruits as oranges, bananas, and fresh apples. France, China and India are the major suppliers of refined sugar.

Table 6 provides some historical perspective to the importation of numerous commodities. As shown, the importation of all food products has grown dramatically since 1975-76, with the exception of cereals which has increased only slightly and sugar which has actually decreased. Table 7 suggests the relative importance of food imports relative to the importation of such other products as industrial supplies, fuels, lubricants, machinery, etc. While primary and processed food imports comprised 71.8 percent of total imports in 1975, this dropped to 62 percent in 1976. It should be noted results not from a decrease in absolute food imports, but rather a more rapid rate of growth in non-food imports. Viewing total imports of all products, Table 8 shows that Yemen is most heavily dependent on products produced in Japan and Saudi Arabia. China, Australia, United Kingdom and India are also major suppliers of Yemen imports.

Yemen Exports

While Yemen is not a major exporter of goods and services (other than labor), Tables 9 and 10 are provided to describe the relative composition, importance, and destination of those exports. Agricultural products comprised the bulk of Yemen's exports through 1975. While its relative importance was declining slightly over time, in 1976 there was a major reduction in agricultural exports. This has been attributed to a rather sudden drop in the production and exportation of cotton. China, Yemen Democratic Republic, Italy and Saudi Arabia are the major recipients of Yemen's exports (see Table 10).

Table 1

YEMEN BALANCE OF TRADE*
(YR Million)

<u>FY end 6-30</u>	<u>1971-72</u>	<u>1972-73</u>	<u>1973-74</u>	<u>1974-75</u>	<u>1975-76</u>	<u>1976-77</u>
1) Trade Balance	-391	-539	-811	-1105	-1666	-3200
Exports	42	34	62	58	55	84
Imports	-433	-573	-873	-1163	-1721	-3284
Govt.	-85	-73	-159	-163	-269	-292
Priv.	-348	-500	-714	-1000	-1452	-2992
2) Service Balance	-7	-53	85	135	196	197
3) Private Transfers	293	505	504	859	2057	3791
Receipts (remittances)	328	564	595	1013	2363	4561
Payment	<u>35</u>	<u>59</u>	<u>91</u>	<u>154</u>	<u>306</u>	<u>770</u>
4) Current Acct. Bal. 1)+2)+3)	-105	-87	-222	-111	587	788 *1
5) M & LT Capital, Net	174	105	277	566	712	659 *2
Official Grants	74	67	148	419	513	470
Official Loans	100	38	129	147	199	189
Disbursements	129	58	144	164	213	208
Repayment	-29	-20	-15	-17	-14	-19
6) Other Capital	52	120	51	-15	-11	566 *3
7) Change in Reserves (increase = -)	-121	-138	-106	-440	-1288	-2013 (*1+*2 +*3)

*Source: Central Bank of Yemen and IMF

Table 2
YEMEN IMPORTS-EXPORTS
(YR Million)

<u>Year</u>	<u>Imports</u>	<u>Exports</u>	<u>Balance of Trade</u>
1964	22.90	4.9	-18.00
1965	27.60	7.0	-20.60
1966	56.40	7.30	-49.10
1967	-	-	-
1968	-	-	-
1969	157.80	18.00	-139.80
1970	178.40	15.80	-162.60
1971	184.80	21.60	-163.20
1972	376.20	20.10	-356.10
1973	564.20	36.00	-528.20
1974	868.10	60.80	-807.30
1975	1341.40	49.70	-1291.70
1976	1879.90	34.90	-1845.00
1977	-	-	-

Table 3

YEMEN'S IMPORTS OF FOOD-RELATED PRODUCTS (1977-78)
(000 YR)

<u>Commodity</u>	<u>Rank</u>	<u>% of Total</u>	<u>1977-78</u>
Live Bovine Animals		.0006	923
Live Sheep		.0114	19,079
Live Goats		.0023	3,795
Live Poultry		.0022	3,676
Live Animals for Human food		.0000	57
Bovine meat, fresh or frozen		.0069	11,505
Sheep & Goat meat, fresh or frozen		.0020	3,406
Poultry meat, fresh or frozen	2	.1005	168,674
Edible offals		.0002	303
Preserved meat		.0146	9,924
Fresh milk & cream		.0217	36,357
Milk & cream, preserved	7	.0454	76,145
Milk & cream, heavy fat		.0020	3,356
Butter		.0154	25,863
Cheese & curd		.0032	5,330
Birds, Eggs	11	.0276	46,331
Fresh & frozen fish		.0000	58
Fish, dried		.0000	1
Fish, preserved		.0125	21,022
Durham wheat	1	.1438	241,355
Rice in husk	13	.0247	41,455
Cargo rice		.0001	142
Barley		.0004	829
Maize		.0048	7,995
<u>PAGE TOTAL</u>			<u>727,581</u>

Table 3 (con't.)

YEMEN'S IMPORTS OF FOOD-RELATED PRODUCTS (1977-78)
(000 YR)

<u>Commodity</u>	<u>Rank</u>	<u>% of Total</u>	<u>1977-78</u>
Millet		.0000	21
Sorghum		.0002	413
Meal, Flour of Wheat	8	.0328	55,011
Cereal Prep.		.0000	15
Cereal grains		.0000	2
Prepared foods		.0003	465
Malt		.0028	4,719
Macaroni, spaghetti		.0008	1,281
Pastry, biscuits		.0083	13,893
Malt Extract		.0009	1,566
Beans, Peas, Lentils		.0009	1,531
Tomatoes		.0017	2,899
Other Fresh Vegetables		.0005	766
Onions, Shallots, Garlic		.0004	648
Vegetables, Fresh or frozen		.0003	552
Preserved Vegetables in Sulphur		.0035	5,908
Preserved Vegetables		.0200	33,624
Fruit or nuts, fresh or frozen		.0016	2,680
Oranges	14	.0245	41,268
Bananas	15	.0235	39,424
Fresh apples	10	.0279	46,808
Fresh grapes		.0002	278
Raisins		.0003	469
Figs		.0003	500
Coconuts		.0004	646
Cashew Nuts		.0003	457
<u>PAGE TOTAL</u>			<u>255,843</u>

Table 3 (con't)

YEMEN'S IMPORTS OF FOOD-RELATED PRODUCTS (1977-78)
(000 YR)

<u>Commodity</u>	<u>Rank</u>	<u>% of Total</u>	<u>1977-78</u>
Almonds		.0035	5,812
Other Edible Nuts		.0000	91
Fresh Stone Fruit		.0000	25
Dates		.0103	17,246
Other Fresh Fruit		.0003	466
Apricot Juice		.0001	110
Jams		.0010	1,660
Fruit & Vegetable Juices	4	.0589	98,863
Preserved Fruit in Sulphur Water		.0001	164
Fruit & Nuts Prepared	12	.0264	44,249
Refined Sugar	3	.0976	163,894
Natural Honey		.0003	570
Artificial Honey		.0076	12,838
Sugar Confectionary		.0183	30,732
Coffee Husks & Skins		.0031	5,264
Roasted Coffee		.0000	0
Chocolate		.0009	1,457
Tea	6	.0553	92,751
Spices		.0128	21,493
Vanilla		.0009	1,515
Mangolds		.0009	1,545
Oil Cake		.0000	7
Margarine	9	.0304	51,021
Soups & Broths		.0022	3,810
Natural Yeasts		.0016	2,841
Vinegar		.0002	295
<u>PAGE TOTAL</u>			<u>558,699</u>

Table 3 (con't.)

YEMEN'S IMPORTS OF FOOD-RELATED PRODUCTS (1977-78)
(000 YR)

<u>Commodity</u>	<u>Rank</u>	<u>% of Total</u>	<u>1977-78</u>
Food Preparations		.0007	1,218
Spa Water		.0017	2,856
Non-Alcoholic Beverages		.0065	10,947
Wine		.0000	58
Beer		.0004	702
Whiskey		.0002	291
Other Alcoholic Beverages		.0005	857
Tobacco		.0129	21,753
Cigarettes	5	.0575	96,437
Other Tobacco, Snuff		.0004	744
<u>PAGE TOTAL</u>			<u>135,863</u>
<u>GRAND TOTAL</u>			<u>1,677,986</u>

Table 4
Ranking of Major Yemen Food Imports by Value
(1977-78)

<u>Rank</u>		<u>(000 YR)</u> <u>Value</u>
1	Durham Wheat	241,355
2	Poultry Meat, Fresh or Frozen	168,674
3	Refined Sugar	163,874
4	Fruit & Vegetable Juices	98,863
5	Cigarettes	96,437
6	Tea	92,751
7	Milk & Cream, Preserved	76,145
8	Meal, Flour of Wheat	55,011
9	Margarine	51,021
10	Fresh Apples	46,808
11	Birds, Eggs	46,331
12	Fruit & Nuts, Prepared	44,249
13	Rice in Husk	41,455
14	Oranges	41,268
15	Bananas	39,424

Table 5
SOURCES OF MAJOR YEMEN FOOD IMPORTS
(1977-78)

<u>Commodity</u>	<u>Source</u>	<u>000 YR</u>
Poultry Meat, Fresh or Frozen	Saudi Arabia	9,622
	Italy	5,717
	Denmark	3,471
	France	70,284
	Holland	64,225
Milk & Cream, Preserved	Yem. Dem. Rep.	1,861
	W. Germany	10,303
	Holland	17,622
	Switzerland	4,604
	Austria	1,296
	Japan	2,666
Birds, Eggs	Saudi Arabia	5,118
	Lebanon	27,812
	USA	2,486
	Greece	2,326
Durham Wheat	Saudi Arabia	3,443
	Australia	229,850
	China	4,566
Rice in Husk	Saudi Arabia	1,112
	Djibouti	19,121
	USA	15,182
	India	4,491

Table 5 (con't.)
 SOURCES OF MAJOR YEMEN FOOD IMPORTS
 (1977-78)

<u>Commodity</u>	<u>Source</u>	<u>000 YR</u>
Meal, Flour of Wheat	Saudi Arabia	4,264
	W. Germany	12,012
	Belgium	4,010
	France	6,826
	Holland	9,248
	Japan	12,041
Oranges	Jordan	7,158
	Egypt	3,698
	Saudi Arabia	26,176
	Cyprus	2,629
Bananas	Somalia	6,449
	Saudi Arabia	25,953
	Ethiopia	3,271
	USA	2,499
Fresh Apples	Jordan	4,755
	Saudi Arabia	34,958
	Italy	2,684
	USA	1,348
Fruit & Vegetable Juices	Yem. Dem. Rep.	10,077
	Saudi Arabia	13,722
	Taiwan	7,958
	Guatamala	13,104
	Djibouti	7,844
	China	7,541
	India	6,940
	Hong Kong	7,932
	Japan	7,296

Table 5 (con't.)
 SOURCES OF MAJOR YEMEN FOOD IMPORTS
 (1977-78)

<u>Commodity</u>	<u>Source</u>	<u>000 YR</u>
Fruit & Nuts, Prepared	Yem. Dem. Rep.	9,233
	U.K.	3,270
	Djibouti	3,667
	Singapore	3,287
	China	7,015
	India	3,097
	Hong Kong	3,785
Refined Sugar	France	59,661
	China	22,390
	India	25,507
	Greece	12,286
Tea	Yem. Dem. Rep.	17,584
	Saudi Arabia	2,750
	U.K.	1,202
	Italy	1,146
	Taiwan	1,266
Margarine	Yem. Dem. Rep.	8,359
	Saudi Arabia	2,958
	France	2,749
	Holland	21,189
	Singapore	4,339
	Malaysia	2,050
	Japan	4,940
Cigarettes	Saudi Arabia	30,171,133
	UK	27,862,472
	Cyprus	8,468,000

Table 6
 YEMEN IMPORTS BY COMMODITY
 (000 YR)

<u>No.</u>	<u>Commodity</u>	<u>1975/76</u>	<u>1976/77</u>	<u>1977/78</u>
0	Food & Live Animals	1,706,894	3,035,329	6,194,926
00	Live Animals	9,513	13,811	27,530
01	Meat & Meat Products	3,831	30,416	193,812
02	Dairy Products & Eggs	34,627	69,850	193,381
03	Fish & Fish Preparations	7,125	16,124	21,080
04	Cereal & Preparations	325,126	299,862	369,209
05	Vegetables & Fruits	70,407	180,367	347,143
06	Sugar & Honey	242,141	166,535	208,012
07	Coffee, Tea, Spices	48,055	29,931	122,482
08	Animal Feedstuffs	644	249	1,552
09	Misc.	90,080	63,561	59,185
1	Bev. & Tobacco	44,375	48,985	134,645
11	Bev.	1,376	3,154	15,711
12	Tobacco	42,999	45,831	118,934
2	Raw Materials	6,599	12,689	31,155
21	Hides & Skins		4,025	615
22	Oil Seeds	2,398	4,281	9,914
23	Rubber			862
26	Textiles	13	95	277
27	Fertilizer		492	4,406
28	Metal Ores		165	116

Table 7

YEMEN IMPORTS BY CATEGORY
(Based on Total Import Index = 100)

	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>
<u>Food & Beverage</u>				
Primary		42.9	37.4	
Industr.		14.0	14.8	
Hshld. Cons.		10.7	10.3	
Processed		28.9	23.6	
Industr.		6.9	3.6	
Hshld. Cons.		22.0	20.1	
<u>Industrial Supplies</u>		21.7	18.4	
Primary		1.4	1.0	
Processed		20.3	17.4	
<u>Fuels, Lubricants</u>		5.0	3.3	
Primary		-	0.1	
Processed		5.0	3.2	
Motor Spirit		0.9	0.6	
Other		4.2	2.7	
<u>Machinery</u>		5.4	9.8	
Machine Capt. Eqp.		3.6	9.6	
Parts, Accessories		1.7	0.2	
<u>Transport.</u>		9.2	14.5	
Passenger Cars		1.9	4.8	
Other		3.3	7.4	
Industrial		2.8	7.0	
Non-Indust.		0.4	0.4	
Parts, Accessories		4.1	2.3	
<u>Consumer Goods</u>		15.7	15.5	
Durable		2.3	1.8	
Semi-Durable		7.2	7.3	
Non-Durable		6.2	6.4	
<u>Goods</u>		0.1	0.1	

Table 8

YEMEN IMPORTS BY ORIGIN
(\$000)

<u>Country</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>
Japan	8,195	16,542	29,359	52,838	41,802
Saudi Arabia	5,087	7,940	10,135	15,486	47,443
China	3,179	4,691	12,949	33,187	25,177
Australia	10,040	2,062	8,440	24,277	27,172
United Kingdom	4,186	5,494	7,649	13,630	26,712
Germany	5,601	5,603	10,849	16,378	18,057
Yemen, Dem. Rep.	8,729	8,788	9,579	16,748	12,138
India	1,230	2,688	3,635	17,865	30,015
Netherlands	1,048	5,403	8,436	10,340	22,827
Djibouti	2,796	7,187	6,477	11,247	18,290
France	6,119	7,803	9,746	7,566	11,435
Singapore	2,054	3,170	5,118	7,850	18,205
USSR	3,159	3,218	9,091	8,634	6,852
Italy	2,058	3,962	4,099	7,284	13,231
USA	1,054	1,261	4,433	5,215	15,463
Ethiopia	514	4,630	9,111	7,360	4,338
Hong Kong	1,682	3,238	6,568	5,796	8,038
Belgium-Lux.	534	4,932	4,846	4,558	3,724
Kenya	314	1,525	2,204	4,561	9,985
Sri Lanka	1,835	3,184	2,254	4,716	5,769
Egypt	3,848	4,573	3,931	2,600	2,637
Korea	-	15	67	846	7,729
Czechoslovakia	1,308	913	3,263	782	2,384
Pakistan	939	1,710	1,874	1,363	1,268
Iraq	897	2,620	1,058	1,094	939
Sudan	730	1,266	3,249	407	297

Table 8 (con't.)

YEMEN IMPORTS BY ORIGIN

(\$000)

<u>Country</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>
Malaysia	5	7	41.	-	5,431
Canada	-	801	3,649	3	2
Argentina	-	4,123	-	-	-
Romania	-	608	109	566	2,665
Thailand	283	-	1,751	1,298	308
Kuwait	4	354	172	1,594	1,183
Jordan	275	844	1,158	921	99
Denmark	28	114	206	673	1,818
Poland	14	107	703	468	1,438
Greece	-	1	34	414	2,143
Sweden	61	39	355	186	1,739
Lebanon	377	386	449	937	143
Switzerland	65	14	172	625	1,318
Cyprus	-	-	-	64	1,585

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Table 9

YEMEN EXPORTS BY CATEGORY
(Based on Total Export Index = 100)

	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>
Agriculture	76.4	76.7	78.0	-	70.1	25.5
Mining-Quarrying	11.1	3.3	0.1	-	-	-
Manufacturing	12.5	20.0	21.9	-	29.9	74.5
Food, Bev., Tobacco	9.6	17.2	19.3	-	17.9	30.9
Textiles	0.0	1.3	1.0	-	8.9	36.4
Wood, Wood Products	-	-	-	-	0.0	4.0
Paper	-	-	-	-	0.2	-
Chemicals	-	-	0.1	-	1.8	0.7
Minerals	-	-	-	-	0.1	0.9
Metal Ind.	-	-	-	-	0.1	0.7
Metal Mfg.	1.1	0.1	0.5	-	0.8	2.8
Other	1.8	1.5	1.1	-	0.1	0.1

Table 10

YEMEN EXPORTS BY DESTINATION

(\$000)

	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>
China	1,645	1,294	2,626	5,700	2,560	
Japan	115	1,742	5,586	306	44	
Yemen Dem. Rep.	939	1,001	1,273	1,210	1,925	
Italy	209	503	807	1,637	1,437	
Saudi Arabia	492	910	537	596	1,156	
Singapore	33	1,297	83	77	77	
USSR	390	449	292	115	-	
Somalia	-	-	1,071	-	20	
France	4	13	596	201	36	
Djibouti	141	217	99	137	109	
Germany	5	23	14	209	122	
Netherlands	20	-	23	222	49	
Lebanon	100	187	6	15	-	
USA	-	34	31	150	42	
Norway	26	65	114	18	5	
Kenya	-	31	64	89	10	
United Kingdom	2	18	32	77	29	
Switzerland	61	34	-	-	-	
Ethiopia	10	12	20	18	1	
Korea	44	-	12	-	-	

SECTION N
INDIVIDUAL TEAM MEMBER REPORT

EDITOR'S NOTE

BY

CLYDE ADAMS

SEPTEMBER 15, 1979

The foregoing reports represent the observations and findings of individual team members who, because of time limitations, were able to see only a small sample of Yemen's problems and opportunities. Also, each individual had to cover more than one technical field, making the task more difficult. The following remarks are intended to supplement the team members' remarks and occasionally to add some clarification. These remarks are based on the experience of the University of Arizona's two years' plus work in the sorghum and millet project and the author's personal involvement in Yemen's agricultural development (two and one-half years).

Several of the Design Team members have directly or indirectly noted the advantages to be gained by cooperation with other donors in order to avoid duplication and learn from each other. In general, the editor's own experience (20 years in the Middle East and East Africa) indicates that cooperation and coordination among donors is better in the YAR than most other developing countries, perhaps because the sheer magnitude of work to be done requires such cooperation.

Some specific examples are cited below to supplement the team's comments:

1. During the summer of 1976 an agreement was reached with USAID, YARG and other donors that the USAID funded sorghum/millet project would serve as the focal point for research in this field. To insure that this would be carried out, regular meetings (every two-three months) were initiated among the sorghum/millet breeders and agronomists. These meetings are still being carried out and are supplemented by annual visits to each other's field plots to observe actual results.

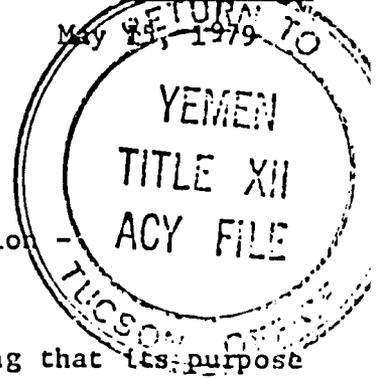
2. Equipment is loaned among donors - for example, the German Farm Project assisted the USAID funded sorghum project by plowing one year and the USAID poultry project swaps manure for straw (for bedding) with the German Amran Valley Project on a regular basis. The USAID funded sorghum project loaned the INDP

It should also be pointed out that the sorghum work undertaken by USAID and the University of Arizona is more concentrated in the low rainfall non irrigated areas of the Highlands areas, whereas CARTC and other donors have directed their efforts towards high moisture conditions (either rainfed or irrigation). These two efforts require different research efforts and are complementary rather than competitive. With regard to millet work, USAID and the University of Arizona's project is limited in Sana and will concentrate more in the Tihama where no other major millet effort is conducted by any donor. Finally, with regard to sorghum, the original work under this project in 1974 recognized the demand by farmers for sorghum straw as well as grain. Because of this, both forage and grain varieties were tested. This work has continued.

The editor strongly endorses the comments made by team members relative to maize research and production under conditions of adequate rainfall or irrigation. Under these conditions, maize will almost always out yield sorghum, both for forage and grain yields. This fact was clearly demonstrated by extensive maize plots grown by TDA in the Tihama at Wadi Zabid from 1975 through 1978.

While the editor agrees that testing of hybrids under Yemen conditions is desirable, he does have some reservations concerning the use of hybrids for any crop variety in Yemen at this time. Although hybrids are usually superior under proper management conditions, their use in Yemen will require extensive farmer education if their potential is to be realized. Furthermore, the infrastructure to develop, multiply and distribute hybrid seed on an annual basis does not yet exist in Yemen.

The editor strongly agrees with team members' comments regarding the potential labor saving benefits from proper mechanization, especially during the peak labor periods of land preparation and harvesting. He would extend these remarks to include regions outside the Tihama, especially such relatively level areas as the Amran Valley and the Montane Plains between Ibb and Sana.



MEMO TO: Files

FROM: Clyde S. Adams *Clyde S. Adams*

SUBJECT: Summary Record Yemen Title XII Design Team Orientation - April 30 - May 1, 1979

Dr. G. Matlock called the meeting to order at 0900 stating that its purpose was orienting the design team members, discussing logistic matters and finalizing other details.

After introductions (see appendix list of participants), Dean D. Metcalfe gave a brief welcome. He traced the University's involvement in foreign development work, especially in agriculture, and noted the challenge the Yemen Title XII program posed to AID, CID and the University of Arizona.

A cultural introduction followed by Dr. Bonine. While the Arabian peninsula with its sand dune climate, is one of the world's least populated areas, the south west corner, including the YAR, has greater rainfall and is relatively more populated.

Geographically, the YAR rises abruptly from the Red Sea rift with only a narrow coastal strip (Tihama) prior to reaching the central mountainous spine which then slopes more gradually east to the desert. The Yemen highlands, with its plateaus, are among the highest in the peninsula. Much of the highlands ranges from 2000-3000 meters with peaks to 4,000 meters. Sana, the capital, is over 7,000 feet. Soils are excellent, being largely derived from basalt. Rainfall in the mountain spine reaches 500-600 mm, 300 mm at Sana 100-200 in the Tihama Coastal strip and drops to traces only in the eastern desert. While most of the Middle East has a Mediterranean climate with winter moisture, Yemen is affected by the Indian Monsoon and has a summer rainfall and occasional unpredictable April showers.

Agricultural land use depends upon irrigation from deep wells or from Wadi diversions and rainfall. There are no perennial streams. The Tihama depends on irrigation, lower mountain elevations on terraces and irrigation, whereas the uplands is largely dryland farming. Eastern highlands have some irrigation from wells. Oasis agriculture exists with date palms. Major subsistence crops are sorghum and millet with cotton and coffee being major export crops. Qat, a mild narcotic, is a profitable, locally consumed crop. Its leaves are chewed in "Qat Sessions" where considerable business and social activities are discussed (separate sessions for males/females).

The 1975 census (first ever conducted) indicated a population of 6.5 million in Yemen's 75,000 square miles. Estimated population of the leading cities today is: Sana 200,000; Taiz and Hudaydah at 100,000 each.

In earlier days Yemen was important because its location dominated the trade routes. The people were Jews. In the 6th century Yemen was occupied by the Ethiopian Christians, who were in turn replaced by the Persians. The final Islamic invasion came in 7th century and Arabic replaced Sabatic as the language. Religious affiliation today is mainly divided between the Zaidi Moslems in the north and mountains and the Shafi Moslems in the coastal and southern areas.

Until recently, the Zaidi's were largely raiders. Other minor religious groups include the Ismaili Moslems and Jews.

Yemen is still a tribal society with only nominal allegiance to the central government. While the pre-revolution Imman represented both religious and civil authority, today's Imman has no civil authority although the country basically adheres to Islamic (religious) law. Due to the pre-revolution isolationist policy of the Imman, basic social infra structure is still rudimentary. The Egyptian supported (50,000 troops) revolution of 1962-67 was basically between the Zaidis (supported by Saudi Arabia) and the Shafis. The new government has had numerous problems with Marxist supported South Yemen, although there have been several attempts at unification.

Dr. Russ Olson made comments regarding the AID program in the YAR noting that the initial effort was from 1959-67 with the major emphasis during that period on capital intensive projects i.e. the Sana Taiz Mocha road and domestic water development in Taiz and villages. AID provided about \$56 million for these programs which were terminated by the revolution. Diplomatic relations were re-established in late 1972 with AID resuming operations in 1973 but with emphasis on institutional development. The 1979 program will utilize about \$14.5 million with \$15.1 million being allocated for 1980.

In the Near East and North Africa region, Yemen and Afghanistan are the only two countries receiving U.S. assistance based on the "poorest of the poor" mandate. Tunisia and Morocco represent countries developed enough for AID to phase out whereas security consideration dictates U.S. programs in Syria, Jordan and Egypt.

The Yemen political situation is precarious with two Presidents having been assassinated in the past year although basic policy remains unchanged. The U.S. involvement reflects our concern for the entire Middle East area.

Saudi Arabia pays most of YAR bills with the military getting 40% of the budget. Agriculture's budget share is low although the U.S. accords it high priority.

On the economic side, foreign exchange from workers remittances is the biggest earner (\$225 million in 1975, \$500 million in 1976, \$1 billion in 1977 and \$1.3 billion in 1978) although the government has not yet effectively channeled these funds into development.

AID's program is based on a Country Development Strategy Paper (CDSP) which is updated each year. For Yemen this lists three options, i.e., (1) highly visible capital development projects which would reap political benefits, (2) direct approach to meeting basic human needs through such programs as food aid (always a temptation in Yemen) and (3) institutional development to build the human resource base (the most difficult of the three). AID selected the third approach leaving other donors to take care of (1) and (2).

AID's programs are designed to: (1) expand socioeconomic and political equity and (2) restore and increase the productivity of natural resources. Along with existing projects, new activities to help accomplish this are planned in land utilization, water resource assessment, primary health delivery, five year educational system and local involvement in national planning.

Current USAID agricultural projects include poultry, horticulture and the U of A supported Sorghum and Millet Improvement project.

Drs. Upchurch and Stewart discussed the Sorghum and Millet project. As yet no improved crop variety has been released but the program is being continued. While the Yemenis can do things they want to do, their work ethic is different from westerners making a research program especially difficult. Some other problems include unlevel fields, lack of proper infrastructure (including provision of supplies/equipment) and coordination with other donors. Progress is being made, however, as the collection of over 600 local varieties indicates.

Mr. Morris Whitaker discussed the BIFAD organization which was established in 1975 with a seven-man board to advise the President, Congress and AID on food and agricultural policy. BIFAD has a permanent staff and two major committees, i.e., Joint Committee for Agriculture and Joint Research Committee.

Current projects include small ruminants and sorghum and millet with others being developed. BIFAD aims to strengthen International Agricultural Programs in the U.S. University system and to improve individual country programs with the latter being the biggest element. BIFAD has been especially requested to monitor the YAR Title XII program partly because of its size and duration (i.e., \$20,000,000 and 5 years).

Title XII emphasizes the "Collaborative Assistance" method of contracting as opposed to "Standard University" contracting. This means that the selected university designs as well as implements projects instead of implementing only.

To be effective collaborative assistance must apply the following criteria:

1. Acceptance of the notion that the host country makes the final decision on what it needs. (This requires excellent and open communications).
2. Requires full trust and respect between agency and implementing institution.
3. U.S.A.I.D. must provide a direct hire project monitor to advise and monitor projects.
4. Full joint planning is required among the host country, U.S.A.I.D. and the design team.
5. Careful contractor selection in order to be fully responsive to country's needs.
6. Establish excellent relationships among host country, contractor, USAID and others.
7. Flexible authority required to permit collaborative changes in implementation plans. (While the design team should specify inputs and outputs and prepare a schedule, some projects are not amenable to rigid specifications). AID Handbook #3 is useful in this regard.

Other comments indicated that the Mission plans to put all of USAID's agricultural projects under the Title XII umbrella. The design team will have to write an overall project paper (PP) to cover this, plus sub project PPs for at least the IBB School and perhaps Seed Multiplication.

6

Two BIFAD (Baseline Studies) documents were pointed out that will be helpful to the Design Team in accessing host country capability in sub-project areas.

Mr. James Wood, of CID, explained the CID operation. CID is incorporated as a nonprofit autonomous group owned by nine universities. The Board of Trustees includes two members from each university and an executive committee and finance committee is formed from the Trustees Board.

CID is headquartered at Logan with an Executive Director, Secretary, two Program Specialists and a Project Manager (Wood). It was organized to assist and meet development needs of LDCs. Currently, 36 people are serving overseas. Staff are seconded from member universities and provided incentives to work overseas. They remain on their own University's payroll.

Background for the YAR Title XII program was given by Olson. The new Mission Director in Yemen concluded that all agricultural activities should be under one contractor and decided the Title XII mechanism would be ideal for this purpose. A core team in Yemen would plan and develop new sub-projects.

An approved PID has been prepared with a goal of "Improving YAR Agriculture" and purposes to "Develop the Human Resources Base" (i.e., Infrastructure) and "Develop Long Term Relationships Between US Land Grant Universities and the YAR". A "Core" group of two people would be stationed in Yemen to assist in agricultural planning and to direct sub-projects. It was suggested that an annual visit be made to Yemen by CID representatives to review core group suggestions and to meet with other donors regarding joint project efforts.

The design team will assemble base line data, present status of activities, review other donor activities, identify gaps and opportunities and do the detailed design of two sub-projects (i.e., IBB and Seed Multiplication). Dr. Kearns will identify target groups and access impact.

Dr. Upchurch noted the following:

- (1) Different CID Universities will undertake various activities.
- (2) AUB will cooperate in these activities.
- (3) Possibility of cooperation with Cal Poly, Tuskegee and others.
- (4) Necessity to work with/around other donors and especially with the World Bank advisory and research groups.
- (5) Necessity to work very closely with the Ministry and to respond quickly and effectively. (The importance of the World Bank Advisory Group was emphasized in this context). Also, Upchurch indicated that it would be necessary to respond to things not necessarily of our prime interest.
- (6) The challenge of the IBB project to mold people and the problem of counterparts.
- (7) Adams is assembling information packets with copies in Yemen and in Tucson. He will also help, as necessary, on the P.P.

The Advisory Committee then met separately with the Design Team Meeting continuing under Dr. Upchurch's chairmanship.

It was pointed out that some compromises would be necessary in our work due to the lack of technical/social/and economic data. The necessity of working with/around other donors was reemphasized. The design team will be expected to make recommendations concerning the three current on-going agricultural projects (i.e., Poultry, Horticulture and Sorghum/Millet). The PP will also treat the core team concept and the composition and function of the Advisory Board.

Dr. Upchurch noted that technical aspects would present less problems than logistics which will be very difficult but pointed out that the Mission Director and his staff are very much committed to success of the Title XII concept.

The meeting was adjourned at 1730 but with most of the group meeting informally at Dr. Upchurch's residence in the evening for a social get-together.

The group reconvened at 0830 May 1st with a recap of the previous day's discussion.

The necessity for promptness in preparing the PP was emphasized. If U.S. fiscal 1979 funds are to be utilized the PP must be submitted to the NE Asst. Administrator not later than Sept. 1. Assuming no snags, it could be approved by Sept. 15.

Dr. Olson suggested that the PP would be expedited if each team member has a "scope of work" or "terms of reference" prepared prior to arrival in Yemen. While this is done by AID for Standard University contracts, it is left to the contractor under "collaborative" assistance arrangements.

Dr. Matlock's office will help in travel, especially passports and visas but all team members must get completed medical statements to him soon. Matlock's office can also help with travel. While the duration of the teams visit is anticipated at four weeks, flexibility should be exercised.

Regarding specific personnel in U.S.A.I.D., Dr. Olson noted the following: Both the Director and his Deputy will be helpful on overall questions and problems. John Young, Morgan Stickney and Charles Uphaus of the Agricultural Division will provide more detailed assistance although John Young may leave Yemen early because of health.

The Advisory Committee for the Yemen Title XII program was discussed. This Committee is expected to oversee all Yemen agricultural activities conducted by the universities. A decision on its exact functions is expected soon. Currently, the membership includes D. Dewhirst, U of A; D. Johnson; CSU, S. Miller, OSU; D. Funk, USU; and J. Hanson, WSU. Ex-officio members include J. Wood, CID; W. Matlock and R. P. Upchurch, U of A; R. Olson, AID/W and M. Whitaker, BIFAD. The committee may meet annually in Yemen in the future and periodically in the USA.

It was pointed out that this committee is different than the one mentioned yesterday. Consideration should be given to having one committee only with perhaps a smaller sub-committee. The PID mentions a committee including the U.S. Universities, other donors, USAID and YARG. This needs to be defined as to members, functions, authority, etc. The design team should address this problem. It was noted that the CORE team would conduct staff work for this committee.

Other business was discussed.

- 8
1. The U of A could make design team reports on a monthly basis to BIFAD.
 2. Support function by USAID/Yemen especially housing - USAID may contract to build houses.
 3. IBB School Mobilization Project (separate from training component) needs one long term and several short term staff. House Trailers and vehicles are being ordered from Jeddah and will be in place by summer (1979). These can be later used by long term project. No housing has yet been considered for the CORE team. The design team should consider this, as it probably is a U of A problem. The status of post PhD. training for an IBB school official was discussed.
 4. Extension work cannot be directly transplanted from U.S. It must be adapted. AUB personnel may be helpful.
 5. Intensive Arabic for core people was discussed.

Distribution:

See Appendix

APPENDIXTitle XII Yemen Design Team Orientation
April 29 - May 1, 1979 U of A

1. Mr. Morris Whitaker - BIFAD - Washington, D. C.
2. Dr. James Thomas - USU, Logan, Utah
3. Dr. Stanley Miller - OSU, Corvallis, Oregon
4. Dr. Don Merkley - MSU, Bozeman, Montana
5. Dr. Donal Johnson - CSU, Ft. Collins, Colorado (absent)
6. Dr. Mack Johnson - WSU, Pullman, Washington (for Dr. James Henson)
7. Dr. Grant Harris - WSU, Pullman, Washington
8. Dr. Eugene Foerster - TTU, Lubbock, Texas
9. Clyde Adams - Tucson
10. Dr. D. Metcalf - U of A
11. Dr. L.W. Dewhirst "
12. Dr. W.G. Matlock "
13. Dr. Jean Kearns "
14. Ms. Ratiba Saad "
15. Dr. D. Stewart "
16. Dr. R. Olson AID/Washington
17. Mr. James Wood - CID, Logan, Utah
18. Dr. R.P. Upchurch - U of A
19. Dr. M. Bonine "
20. Dr. R. Greenwalt "
21. Dr. D. Heckerman "
22. Dr. A. Day "
23. Mr. Dale McDonald "
24. Dr. Boyd Wennegren - USU, Logan, Utah (for Dr. Dennis Funk)

SECTION P

MEMO TO: Files
FROM: Clyde S. Adams
SUBJECT: Summary Record, Yemen Title XII Design Team Final Meeting
September 5-6, 1979, Tucson, Arizona.

The meeting was opened at 0830 by Dr. R. P. Upchurch, who asked Dean D. S. Metcalfe to present a few remarks.

Dean Metcalfe welcomed the participants and, by way of emphasizing the difficulties of working in Yemen, cited recent TV coverage on the Yemen Arab Republic. Yemen essentially is at base "zero" in its development process and it will take tremendous efforts for a successful program. He stated, however, that CID and the University of Arizona are dedicated to the effort.

After introductions, (see Appendix "A" for a list of participants), Dr. Upchurch noted the excellent work of the Design Team in preparing the draft Agricultural Development Support Project Paper, the Baseline Field Study Report, the Agricultural Water Resources Project Identification Document and other documents. He then proposed the following agenda:

WEDNESDAY

0900 - 1000 Overview by Don Heckerman
1000 - 1020 Coffee
1020 - 1200 Issues including: schedule of events, Heckerman's report, priorities, Ibb ATC, and relationships with other donors, USAID, YARG, CID, etc.
1200 - 1300 Lunch
1300 - 1500 Reading Time
1500 - 1700 Design Team Meeting

THURSDAY

0800 - 1000 Design Team Meeting (cont'd.)
0900 - 1000 CID Advisory Committee Meeting
1000 - 1200 Final comments.

Dr. Heckerman began his remarks by stating that AID's overall objective for the Yemen Title XII program is to involve CID in the total Mission agricultural program in Yemen. The Design Team was requested to undertake a general assessment of Yemen's agricultural sector and to pay specific attention to the following: Develop a Project Paper for the Core Project, develop a Project Paper for the Ibb/ATC, look carefully for opportunities for intervention in the areas of soil fertility, water management, agricultural research, extension, forest and range restoration, credit and cooperatives.

The Team spent more than 365 person days in Yemen.

While the Team felt that the inadequacies of the extension system constitute the biggest constraint to agricultural development, the problem does not appear to lend itself to comprehensive intervention at this time. The Team also did not consider it timely to make recommendations in credit and cooperatives. The Core Team should monitor these areas and make recommendations when appropriate. The Design Team also decided that a CID Seed Certification and Multiplication Project would not be necessary in view of the progress the UNDP is making in this area. CID could be supportive in this area, however, in the training field.

Heckerman presented a list of eight tentative projects which the Design Team proposed to the Ministry of Agriculture in July (see Appendix B). In terms of budget allocations, the two principal categories are training/education and water resource development and use. Education/training includes the Ibb/ATC (first of its kind in Yemen and details to be provided later by Harold Matteson), academic training (especially the M.S. level), both in CID universities and neighboring Arab universities, special training, both inside Yemen and outside for non-degree candidates and inservice training for Ministry of Agriculture personnel.

Water was determined to be a major constraint to development, but the Team assessed opportunities to be excellent for much more productive use of this scarce resource. The Team firmly believes that extension efforts in the area of "on farm" water management can have short term payoffs as well as longer term benefits.

A question was raised regarding water resource infrastructure. Very little exists, especially trained and competent staff. Linkages are also poor. However, individual projects have developed some infrastructure.

Dr. Upchurch noted that items 4, 5, 6 of Appendix B (poultry, sorghum/millet and horticulture) represent current activities for which YARG wants continued support. These projects were not detailed in the Team's report as each has its own project paper. The University of Arizona is involved in the sorghum/millet project and cooperative efforts will be conducted with Tuskegee regarding horticulture. While the first phase of the poultry project has been completed, arrangements may be made with Cal Poly regarding phase two.

Heckerman noted that items 7 and 8 (Documentation Center and Women in Development) are necessary activities that YARG wants but no one else is doing. Dr. Kearns noted that women are increasingly important due to the large numbers of males (perhaps 35-40% of the male labor pool) working outside Yemen. Women have traditionally had a large role in poultry raising and are moving into other more traditional male roles, such as land preparation and planting.

Dr. Harris provided some background regarding range/forest land. While the country used to be forested in part, trees and forage have been grossly depleted for fuel and by over grazing. He suggested a program to alleviate these problems and also to save soil and water resources by growing trees and forage on marginal terraces.

Dr. Olson reaffirmed that AID wanted the Design Team to review the entire agricultural sector and that sub-sectors in the PID were meant to be illustrative. While the AID/W Contract Office likes more specificity, NE/TECH wants an orderly development of the agricultural sector and expects the Core Team to engage in a continuous review designed to identify opportunities for successful intervention.

Dr. Upchurch, in commenting on the above, noted that the "Collaborative Assistance Mode" calls for exactly such an approach which CID intends to follow. He also commented on the difficulties of working in the Yemen and the necessity of developing good working relationships with YARG, the Mission and other donors, especially the World Bank advisory group. During the Design Team's stay in Yemen, several informal and formal meetings were held with the above groups. One problem was the absence from Yemen, for varying periods of time, of several key Mission officials, including the Director, Food and Agriculture Officer and Program Officer. An invitation to visit CID campuses was extended to three Ministry of Agriculture officials and also to the World Bank Team leader. It is expected that these visits will occur this Fall.

Dr. Upchurch mentioned that the Ibb/ATC required discussions with the Ministry of Education.

In reply to a question whether extension is an institution or a process, it was stated that there is no real national extension service as yet, but that many of the individual donor projects include extension efforts.

Dr. Ken Duft noted the role of the LDAs (Local Development Associations). These were sanctioned 13 years ago at the Governate level, but did not function well, partly due to the Civil War and partly due to the tribal pressures. In 1973 these were moved to the village level and have been much more successful.

Some brief observations on agricultural credit were offered. Large amounts of cash are now available from workers' remittances and Islamic restrictions on interest rates work against a credit system.

Dr. Upchurch commented on scheduling. The Core Team concept must be moved forward, the water resources program started and training for most Ministry of Agriculture employees planned. It is hoped that a contract can be signed November 1, 1979 and implementation started January 1, 1980 with one CORE team professional and an administrative officer.

Other items discussed include the Documentation Center for the Ministry of Agriculture, new projects and Women in Development (WID/HELP). In the latter case, there is strong support from the Mission, but mixed signals from the YARG on how to proceed. While Mohammed Jagman, Deputy Minister of Agriculture, supports the principle, he did not indicate a high priority and indicates discussions with the Ministry of Social Affairs are necessary.

Dr. Upchurch indicated that the Title XII program is very ambitious and requires broad CID involvement. It is vital that the Advisory Committee focus on who is available for what. For example, the Agricultural Water Resources Project, due to its size and complexity, may require several CID universities, each leading in a specific sub-activity.

It was noted that AID is bidding for CIE services in several developing countries and the question was raised as to AID's priorities. Dr. Olson replied that AID would not set any and that CID would have to respond to each request according to its own priorities and abilities. It was noted that CID universities might have to increase staff to fill these requests. Mr. Wood stated that after this meeting, CID would have a better idea of both Yemen's needs and CID's ability to meet them.

Commenting on the Team's efforts, Dr. Heckerman noted that each member prepared individual field trip reports and made contributions to the overall effort. However, the entire team was unable to gather at one time to finalize the project paper and other documents. This meeting is the last opportunity for CID to make revisions.

Dr. Matteson was asked to comment on the Ibb/ATC. Before doing so, he suggested the University of Arizona extend a vote of thanks to Dr. Heckerman for his efforts. He also stressed the necessity for predeparture orientation and backstop support for field personnel. The following comments were made relative to the school:

1. Opportunities for agricultural training are limited. Ibb/ATC is the first agricultural secondary school in Yemen. It will provide both training for students and an outreach program. Later schools at Surdud and Sana may be opened.

2. Ibb/ATC is located 3½ hours (by car) south of Sana and 45 minutes north of Taiz.

3. The World Bank originally agreed to build and staff the school but construction problems have delayed completion.

4. Ibb/ATC will be a three year program with a total enrollment of 270 students. Learning by doing will be emphasized.

5. Forty hectares of land is to be provided and \$400,000 worth of commodities ordered by the World Bank are in country.

6. Opening day is October 15, 1979. Mobile homes will be used by expatriate staff.

7. Standby generators will provide electricity pending hook-up to the Ibb city system.

8. A well has been drilled but not tested as yet for yield.

9. Thirty Yemenis will be trained to the MS level and 12 to the BS level for faculty positions. One American (Director) and five expatriate Arabs will serve initially. (Seven candidates have been identified for five positions).

The meeting adjourned for lunch and individual reading assignments.

The Design Team group reconvened at 1500 with Dr. Foerster reporting on his activities. He gave considerable technical data on water/soil of the Tihama and Highlands regions and stressed the agricultural potential of the Tihama if water and soil fertility are managed properly.

Dr. Duft commented on cooperatives and credit, especially the role of the LDAs. He mentioned that Western concepts do not apply to cooperatives and that credit expansion is hampered by Moslem taboos against interest rates and by excessively conservative lending policies. For example, true land values are not used by lending agencies and there is a reluctance to give land as security. Also, landless farmers have no collateral. Inflation is also eating up the initial capital of the Agricultural Development Bank. Little information is available regarding non-institutional credit.

Dr. Thomas reported on agronomy and seed multiplication. The amount of agronomic and crop research is very limited (mostly by donors and expatriates) and trained staff is the major problem as there is no depth. The overall agronomic potential is very good, however. The Seed Multiplication effort by CID will be restricted to training staff in support of the World Bank project.

Dr. Grant Harris deferred his remarks to the evening, when he promised to show slides at Dr. Heckerman's residence (after cocktail/buffet dinner).

EDITOR'S NOTE: Additional details of activities of the above team members as well as those unable to report will be found in the individual team reports which are available upon request.

September 6, 1979 - 0800-1030 - Design Team Comments

Corrections, clarifications and additions were provided to the PP for the final version. These were noted by Heckerman and Adams and will be incorporated into the PP.

Dr. Mayberry was asked to comment briefly regarding his institution's efforts on the horticultural project. He cited the problem of getting nominated people accepted, noting that 11 nominations were rejected for various reasons including age, experience, physical condition and lack of Arabic language capability. He also was disappointed in the logistical and administrative support provided by USAID. He did state that considerable amounts of plant propagating materials have been taken to Yemen for planting. He requested all possible assistance from CID.

1030-1200 -- Final Comments, Advisory Committee and Design Team

Dr. Dewhirst noted that the University of Arizona was familiar with some of the problems of working with developing societies and noted the difference in "time" concepts between the Navajo Indians and Anglo-Saxons. He commented that the CID Advisory Committee represents all the CID member universities and that additional members may be added for the annual review meeting in Yemen (including host country, AID, other donors). In clarifying CID's operational structure, he quoted from a CID policy paper dated August 10, 1979. "The organization of the Consortium is based on the policy of centralized policy making, fiscal control and technical program review, with decentralized responsibility for technical programs and activities." Basically, the role of the Advisory Committee is to counsel and advise project directors. It is a policy making and review committee, not managerial.

Dr. Dewhirst noted that the Committee fully endorses the Design Team's work and stated that it was "logical, well formulated and in proper proportion. CID will be asked to solicit degree of interest from its member universities."

Major items of immediate concern are to provide inputs to the Core Team and to launch the Agricultural Water Resources Project. In the future, attention will be devoted to WID/HELP, Agricultural Faculty and the three on-going projects (sorghum/millet, horticulture and poultry). He concluded his remarks by stating that the Design Team had done an excellent job in a limited time frame under very difficult circumstances. He especially commended Drs. Upchurch and Heckerman for their efforts.

Dr. Heckerman again called for any last minute changes to the PP and other documents and Dr. Matteson commented on CID administrative details.

The meeting adjourned at 1200.

Title XII Yemen Design Team Final Meeting

September 5-6, 1979, Tucson, Arizona

D. Metcalfe	Dean, College of Agriculture, University of Arizona			
L. W. Dewhirst	Associate Dean, College of Agriculture, University of Arizona			
Dr. R. P. Upchurch	Yemen Title XII Program Director,	"	"	"
Dr. D. Heckerman	Design Team Leader,	"	"	"
Dr. Jean Kearns	Design Team Social Scientist,	"	"	"
Ms. Ratiba Saad	Design Team Soil Scientist,	"	"	"
Dr. R. Voigt	Plant Breeder,	"	"	"
Dr. R.R. Rice	Director, School of Home Economics,	"	"	"
Dr. Amy Jean Knorr	School of Home Economics,	"	"	"
Dr. Naomi Reich	School of Home Economics,	"	"	"
Dr. R. W. Rice	Head, Animal Science Department,	"	"	"
Dr. C.C. Cable	Extension Economist,	"	"	"
Dr. Paul Drake	Extension Specialist,	"	"	"
Dr. Ed Flipppo	Professor Management,	"	"	"
Dr. W. G. Matlock	International Agriculture Programs,	"	"	"
Dr. R. Grenwalt	" " "	"	"	"
Dr. R. Olson	NEA/TECH/AGR/AID			Washington, D.C.
Mr. T. Atwood	"			" "
Dr. B.D. Mayberry	Tuskegee University,			Alabama
Dr. Dennis Funk	CID Advisory Committee			Utah State University
Dr. J. Thomas	Design Team Agronomist,	"	"	"
Mr. J. Wood	CID Office			Logan, Utah
Dr. D. Johnson	CID Advisory Committee			Colorado State Univ.
Dr. Harold Matteson	Project Director, Ibb/ATC Project			New Mexico State Univ.
Dr. Clyde Eastman	CID Advisory Committee			New Mexico State Univ.
Dr. E. Foerster	Design Team Agric. Engineer			Texas Tech. Univ.
Dr. Grant Harris	Design Team Range Management Specialist			Washington State Univ.
Dr. Ken Duft	Design Team Agr. Credit/Coop.,	"	"	"
Dr. M. Waananen	CID Advisory Committee	"	"	"
Dr. Stanley Miller	CID Advisory Committee			Oregon State University
Mr. Clyde S. Adams	Consultant, Univ. of Arizona			Tucson, Arizona

APPENDIX B

CID/USAID PROGRAM FOR AGRICULTURAL DEVELOPMENT
SUPPORT IN THE YEMEN ARAB REPUBLIC

A Tentative List of Projects

1. Agricultural Education
 - a. Ibb Secondary School
 - b. Surdud Secondary School
 - c. Sana Livestock School (?)
 - d. University Faculty of Agriculture

2. "Core" Team
 - a. out-of-country training for Ministry of Agriculture staff
 - b. short term experts for emergency assistance to Ministry of Agriculture (e.g., animal disease specialists)
 - c. support to planning directorate (American graduate students to work in planning directorate while Yemeni staff are out-of-country for training and short-term experts)
 - d. develop additional projects

3. Agricultural Water Resources Program
 - a. water inventory (water resources survey, sustainable yields, depletion rates, changes in water quality)
 - b. allocation and policy options
 - c. on-farm water management (initial efforts concentrated in the Tihama)
 - d. demonstration watershed project
 - e. drylands field research project

4. Sorghum-Millet Research

5. Poultry Extension

6. Horticulture Research and Extension

7. Agricultural Documentation and Learning Resource Center
 - a. collection of reports
 - b. books and technical journals
 - c. TV, radio and movie materials for extension service

8. Women in Development-Home Economics Learning Program.
 - a. food and nutrition
 - b. women as agricultural producers
 - c. clothing and housing
 - d. human development and sanitation

APPENDIX A
TO
CORE PROJECT PAPER

SOCIAL SOUNDNESS ANALYSIS
FOR THE
CID TITLE XII PROGRAM
YEMEN ARAB REPUBLIC

Submitted by:
Joan Ruley Kearns
July, 1979

Preface

The attached social soundness analysis relates to the broad CID Title XII program. Statements, therefore, are broadly based and of a general nature. The lack of research in several areas hampered attempts to ascertain future trends, actions and/or reactions. In some cases, the available research was of such a limited nature as to be almost useless in any attempt to generalize to a broader population. In addition, there appears to be a lack of studies that define specific causal relationships between processes and behavior. With this in mind, the decision was made to analyze each satellite activity separately. The variety of satellite activities and possible diverse action-reaction outcome cautions one in making a priori assumption that specific features of a process invariably lead to certain kinds of social change.

It is this writer's strong recommendation that a research component be built into every satellite activity. The purpose of the research would be to analyze the social changes accompanying the agricultural-rural-economic development taking place in the activity. This may sound like an ambitious theoretical scheme requiring a vast quantity of comparative data but one must remember that on-going planned data gathering is far easier and economical than data gathering after the project is over or well under way. In terms of measured output and observable changes the only answer is a built-in research component. Specific methods of collecting data will be dependent upon the nature of the activity.

OUTLINEPage No.

I. <u>Social Soundness Analysis</u>	
Introductory Statement	A-1
Scope	A-1
A. <u>Sociocultural Feasibility</u>	
Review of social landscape	A-1
Existing organization	A-5
Allocation of time	A-5
Motivation	A-6
Participators	A-7
Obstacles	A-8
Communication Strategies	A-10
B. <u>Spread Effects: The Diffusion of Innovation</u>	A-10
Review of initial setting, broader population	A-10
Leadership/authority	A-11
Patterns of mobility	A-14
Previous project design	A-15
Maximum information and resource distances	A-16
C. <u>Social Consequences and Benefit Incidence</u>	A-16
Access to resources and opportunities	A-17
Employment	A-19
Rural displacement, migration and urbanization	A-22
Changes in power	A-22
D. <u>Target Group</u>	
Description of target group	A-22
Problems of target group members	A-24
Recommendations	A-26
E. <u>Summary</u>	A-27

I. Social Soundness Analysis

Introduction

The overall objectives of this project are concerned with developing a long term relationship and plan in order to modernize and revitalize Yemen's agricultural sector while developing the human and administrative infrastructure necessary for agricultural development. Basically, the project entails the development of a "core" activity designed to provide a wide spectrum of support directly to the Ministry of Agriculture in instruction and research while providing coordination systems for various satellite development activities. Therefore, the beneficiaries of the project are represented in multiple educational levels, social groups, geographic areas, cultural sub-groups, religious sub-groups and village/family constellations. A complete analysis of the project's social soundness must relate to the previously listed diverse groups. Due to the wide range of satellite activities a specifically designed on-going social analysis will be necessary as the project progresses.

Scope

In the presentation, relevant social information has been divided into the following headings: (1) sociocultural feasibility, (2) spread effects, (3) social consequences and benefit incidence, (4) target group, and (5) summary. In these sections, the diverse needs of population groups are addressed with special emphasis upon utilizing and strengthening existing social structures and mores. The philosocial approach is one of emphasizing the strengthening aspects of the existing social order while introducing improved technology. Interference with the existing social order is not one of the aims of the project. Rather the project's sociocultural involvement may be characterized by co-existence, self-determination, cooperation and cultural integration of technology.

A. Sociocultural Feasibility

Review of social landscape

A very descriptive statement relative to the overall social landscape of Yemen appeared in the 1978 Country Development Strategy Statement. (Yemen Arab Republic, USAID/Yemen, March, 1978). The statement is as follows:

Today's Yemen is a contradiction. If development were measured solely by GNP, Yemen would be one of the world's fastest developing

countries. Per capita GNP was only \$172 in 1973/74 while in 1976/77 it was a respectable \$469, an increase of 40% per year over the 3 year period. In almost any other terms - infant mortality, education, life expectancy - Yemen is still one of the least developed countries in the world. Even if there were demand for the services needed to ameliorate these conditions, the institutions and human resources required to supply them do not exist. This is not to deny that some progress has been made: out and out starvation is rare; malnutrition exists, especially among children, but is probably on the wane; and housing generally is being improved. Nevertheless, economic prosperity has not measurably increased the quality of life for most Yemenis, and some have indeed been bypassed.

The most recent Country Development Strategy Statement, (USAID Yemen, FY1981) agrees basically with the overview expressed in the 1978 statement. However, this later statement places the 1976/77 per capita GNP at \$392, somewhat lower than the earlier figure. The remittances from migrant labor for 1977/78 was estimated at \$245 per capita which represented a significant increase in a five year period.

The above paragraphs in combination briefly describe Yemen in a social context as of summer 1979.

Modern Yemen society is based on relations among social groups whose membership is determined by birth and whose subsequent ranking follows a strict hierarchy. The upper class consists of the Sayyids who claim descent from the Prophet Muhammad. The second class is made up of hereditary holy men of south Arabian ancestry. The next stratum consists of the tribes who are above the artisans and merchants in respectable trades who are in turn superior to families who practice despised trades. The lowest social group, the Alhdam, are so low on the social totem pole that it apparently does not belong to ordinary society for practical purposes. The Sayyids and the elite religious classes maintain an elevated social position as well as a larger proportion of wealth. Currently, there is evidence that the rigidity of these social classes is beginning to be modified.

Education and literacy parallel the social strata rather closely. For example, the Area Handbook for the Yemens by Nywp et al, U.S. Government Printing Office, 1977, describes one Hadramant town in which 80 percent of Sayyid male household heads were literate while for other social strata groups the percentage of literate males is between 30 and 45 percent. The traditional educational system has been dominated by the Sayyids and many of them acquire their education in that same

system. A large proportion of the existing literacy among other lower social classes appears to have been acquired during labor migration. The overall literacy rate for males is approximately 25% and the rate is approximately 2% for females. As of 1975 approximately 1,200 women had gone beyond primary level education. Twenty-nine percent of primary aged school children are enrolled in school while 8% of preparatory and secondary aged children attend classes. The country's educational facilities have been undergoing considerable improvements since 1970. Between 1970 and 1978 the number of primary schools increased by 300%, secondary schools by 700% and Sana University was established.

The varying available resources, life styles and social mores are evident in comparisons of urban and rural quality of life. Educational progress has been greater in the urban areas. Forty percent of the country's population are in the three urban governorates while 67% of the primary students, 87% of preparatory students and 92% of secondary students are in those same governorates. Ninety two percent of the total population live in rural areas. The remaining are urban dwellers in towns and cities or pastoral semi-nomads who live in the northern and eastern sections of the country.

In addition to the differences in urban and rural life, there appears additional distinctions between the lifestyle of the lowlanders and that of the highlanders. In the lowlands the pastoral clans originally ranged and settled according to the availability of grazing land and water. In the highlands due to the frequency of arable spots, fixed settlements appear to be the rule rather than the exception. The highland villages often have the appearance of fortresses. Clothing and customs relative to veil wearing by the women vary from rural to urban areas as well as from the highlands to the lowlands.

The Yemni legal system is based largely upon Islamic law and tribal customs. The tribes settle tribal law violations according to specific custom in tribal courts. Islamic law provides regulations in matters relative to the family, worship, criminal actions and private affairs in general. Islamic judges administer the law and the civil government execute the court's judgments. In addition to the tribal courts and the Sharia courts, the government administers the civil courts which

try civil cases.

Central to the lifestyle of the Yemen is adherence to the Sharia or the Muslim way. In addition to daily prayers, weekly attendance at the mosque, observation of the yearly Ramadan fast, declaration of faith by reciting the Shahadah and at least a once-in-a-lifetime pilgrimage to Mecca, the Muslim society is a powerful influence in the daily life of the people. Marriage customs, sex roles, divorce practices, inheritance laws as well as most human functions are dictated by the rules of Islam. According to the Sharia, women are subordinate to men and children are considered a blessing. In an Islamic court, a woman can inherit half of what a man can legally inherit while in court proceedings the woman's word counts for half of a man's testimony.

Strong cultural norms have traditionally resisted the education of women and the entrance of females into the urban labor force. Early marriages with the resulting early childbearing further serve to deprive women of educational opportunities and keeps them out of the labor market. Comparatively few women remain single into their twenties. Instead of being freer for work and study, however, the single girl is in a very protected position since her marriageability is at stake. The relatively few Yemen women who are in professional positions are generally of the Sayyid or Qadhi elite classes. This pattern of the elite women being the first educated in a country and taking the first professional positions is evident throughout the Middle East.

Central to any discussion of quality of life is the topic of health care and conditions. Existing relevant statistics are as follows:

- (1) The crude birth rate in Yemen is 46 per 1,000, the crude death rate is 25 per 1,000 and the infant mortality rate exceeds 150 per 1,000.
- (2) The average life expectancy is approximately 37 years.
- (3) The medical doctor - person ration, excluding the three major cities, ranges from one to 26,000 to one to 157,000.
- (4) There is widespread diarrheal diseases, tuberculosis, malaria and schistosomiasis.
- (5) Approximately eight percent of the population has easy access to water and 83 percent rely upon unclean water sources.

- (6) The nutritional intake per person is inadequate with some sub-groups experiencing a declining nutritional level.
- (7) The national health system is inadequate and consists of approximately 76 understaffed rural health units. The health unit staff ratios vary from 1 to 6,000 up to 1 to almost 20,000.

Existing Organization

Kinship in Yemen is reckoned patrilineally and households are based on blood ties between men. Traditionally the individual subordinates his personal interests to those adopted by his family. The family is viewed as a group whose importance outweighs the individual's importance. The family is a strong unit in which childrearing practices train the young to be family group members rather than individualists. It is therefore clear that innovations in planting, seed production, poultry production, and other related activities must be presented so as to win acceptance and support in the primary social unit, the family.

In addition to acceptance by the family, the social scientist must be keenly aware that the social structure of Yemen is extremely complex and shows significant detail variations from one locality to another. Each project satellite activity must be carefully reviewed relative to specific goals, geographic location, possible participants and target groups. Tribal groups, villages or urban areas have individual power structures which are based on tradition, tribal customs, social class and/or religious law. Each group of potential project participants must be analyzed as to power networks which may be utilized in the determination of whether to work through existing organizational forms or to create new organizations. The final review and decision must be made on an activity-by-activity basis. The final evaluation must consider positive and negative effects as well as other tangible and intangible factors.

Allocation of Time

Time in Yemen is viewed in a different way than in western society. The clock is not in a position of dominance and being "on time" does not appear to be a virtue. Time is flexible and tomorrow is always waiting if something is not accomplished today. The Muslim calendar is a lunar calendar and as such religious events occur at different times from year to year.

Business discussions are leisurely and may extend over a period of time. Polite conversation takes place as preparatory to most business discussions. Inquiring into the health of one's family is an expected ritual. Therefore, when preparing local groups for new programs or the acceptance of new information, time must be allowed for numerous conversations, discussions and follow-up. Time spent in such initial information sharing pays off later as the project progresses and forms the basis of future understanding and acceptance on the part of the local people.

Review of necessary time allocation for individual activities will take place on an activity by activity basis relative to geographic region as well as other factors. In addition, as specific participants are identified, a review should be undertaken in order to assess the amount of discretionary time available to the participants. A determination relative to participant affordable time must be based on observation, input from participants and consideration of seasonal work and life styles.

Motivation

The Swiss Technical Cooperation Service, Report No. 5: Data Bank of the Population Census 1975 estimates a Yemeni resident population of 4,705,336 and an emigrant population of 331,646 in February 1975. A report funded by the World Bank based on the findings of a mission to Yemen Arab Republic in February-March 1979 estimated the emigrant population to be 700,000 workers or 38% of the YAR labor force. The Swiss Report defines emigrants as "Yemeni nationals abroad who remain in close contact with their relatives in the Yemen, the majority of them being short-term absentee workers or otherwise called intermittent laborers abroad". The emigration of labor and the remittances appear to have affected agriculture more deeply than other sectors of Yemen life primarily due to the fact that the rural areas supply most of the emigrants. This results in a decrease in the available labor force for rural agricultural work and has led to the abandonment of marginal lands and a general decrease in agricultural production. The observed decline in agricultural production is detailed in the Swanson Report.

Emigration has also increased the cost of the remaining labor. At the same time, the farmers are facing increasing competition from

imported foodstuffs which are not subject to duty payments. Certainly the above mentioned factors would be obviously basic to any planning relative to motivation in the area of agriculture. Using the effects of emigration as a starting point each participant target group must be carefully observed so as to ascertain the specific goals of that group which could be articulated in the goals of the project.

When determining specific motivational techniques the approach must be multi-faceted in nature. That is, successful motivation must be determined to incite initial interest while at the same time the possible end result must be evaluated in terms of the population's view of the gains from the project activities.

Participator Profiles

Different project activities will require participants with differing minimum requirements. The following information is presented relative solely to the core activity.

Table A. Social Soundness Analysis - Minimum Yemen Participator Profiles

Specific Program Activity	Yemen Participator Minimum Requirements (Suggested)
1. Core Activity - Coordination/Linkages	Ministry of Agriculture personnel with: <ul style="list-style-type: none"> (a) complete understanding of effects of program, (b) a positive attitude towards the program, (c) a positive attitude towards AID/CID personnel, (d) extensive knowledge of Yemen, (e) extensive knowledge of Yemeni people, (f) membership in upper social class, (g) a Master's degree or equivalency in Agriculture or closely related field, (h) good speaking, reading and understanding of English language, (i) positive understanding and appreciation of rural Yemen people, (j) understanding and good relationships within Ministry of Agriculture and Yemen government, (k) good communication skills, and (l) ability to organize and get the job accomplished.

Ultimately, the project with satellite activities should affect and involve a variety of Yemeni participators. The core activity should be viewed as narrow in the context of number of direct participators but broad in terms of indirect participators. The satellite activities are planned to involve participators from rural and urban areas, various social classes and a variety of life styles.

The importance of personal contact with possible participators in the core activity cannot be over emphasized. Contacts initiated by the Design Team involve personnel from various government ministries as well as individual Yemeni persons who provided input relative to existing communication networks.

It is impossible at this time to estimate the numbers and location of potential participators. In the overall picture the total pool of possible participators would include approximately 884,000 rural households which include 800,000 farms and 92% of the total Yemeni population. Various satellite activities will tap this pool utilizing varying methods at different times with differing goals.

Obstacles

Each activity will be somewhat individual and unique in the list of possible project implementation obstacles. However, some potential obstacles will be present to a greater or lesser degree for each activity. Concerns/obstacles may be clustered into social, political and religious subheadings as shown below.

(1) Social Concerns

Present day Yemen society is based on relations among social groups whose membership is determined by birth and whose ranking follows a strict hierarchy. Persons of superior rank will not work effectively for persons of lesser social rank. Therefore, if an Akhdam is put in charge of an activity one cannot expect a member of the Mashaykh to take directions from said Akhdam and the activity may not become operational.

The treatment of women varies with social standing. In general, women of the higher ranks are more strictly secluded than women of lowest ranks. Women are not allowed to marry into inferior groups. Casual social contact between the sexes common in the western world is unknown in Yemen. Arab societies generally value men more highly than women. The birth of a male in the family calls for a

celebration whereas the birth of a female does not. The involvement of women in the project must be carefully considered and planned.

Family honor resides in the women of the family but it is the property of the natal family. The slightest implication of unavenged impropriety, especially if it is public could completely destroy the family's honor. It is the obligation of the men of the family to enforce the family honor even if it costs the life of a sister or daughter. Other events may cause a family to lose social standing and this loss makes life very difficult for the family. Knowledge of previous events in villages and the social structure of individual families of the participants will aid in the delivery of information and ensure cooperation.

(2) Political Concerns

Traditional patterns of leadership and authority are beginning to change and the central government is beginning to reach out into all sections of the country. The younger generation are beginning to replace traditional leaders. The project must be alert to the above energizing patterns as well as formal and informal roles assumed by appointed and elected officials as well as tribal Shayks, landlords, religious leaders and heads of extended tribal families. Overlooking a key leader in planning or implementation of activities, may, in effect, eliminate possible involvement and cooperation of a large group of possible participants.

Government expenditures on economic and social services have been very limited in the recent past. Military expenditures have been relatively high with 50 percent of the budget going to defense, public order and safety in 1976/77. The process seems to be changing now. However, it must be noted that government expenditures may reflect the value system of the current government.

(3) Religious Concerns

Daily prayers, weekly mosque visits and observation of feasts and fast period (Ramadan) do have an effect upon timing of activities. The work plans will have to take the timing demands into consideration otherwise the frustrations will be great.

The Sharia outlines and gives directions in the individual's political, social, domestic and private life. The Muslim must

follow the Islamic community leader. Therefore, the project should be very careful to acquire support from Islamic community leaders as well as all spiritual leaders.

According to the Sharia, women are inferior to men. This is true also in the legal system. Generally, women and men do not socialize together. Information must be given to men first and plans should include separate programs for men and women. Changes appear to be beginning to occur in this particular treatment pattern with the southern part of Yemen becoming more liberal relative to women's education.

Communication Strategies

The basic method of communication would be most effective at the grass roots level. Person-to-person discussions must be planned so as to make certain that the information which is distributed at any one point of time is a standard presentation. Information should go to group leaders first. In addition to face-to-face information distribution sessions, radio and television should be used. Radio transmissions must be planned so as to be aired at times when large numbers of the target population may be listening. Observation and/or informal interviews will provide additional information which will help in planning specific communication strategies for specific groups.

Each satellite development activity will be reviewed on an activity by activity basis in terms of participants, motivational techniques, time allocations, or considerations, geographic area, characteristics of participant lifestyle, possible obstacles and communication strategies.

B. Spread Effects: The Diffusion of Innovation

Ultimately the success or failure of any project rests on the variety and/or amount of people who are affected by the project. People become participants and/or supporters of the project work through an understanding of the project which comes about through the acquisition of information about the project activities.

In addition to the dissemination of information, the project team members must be sensitive to and must plan with the following items in mind.

- (1) Content of the information must be understandable and self-explanatory.
- (2) Informational releases must be planned with follow-up and repeat sequences. Releases must also be in various forms, i.e., radio, television, and posters.
- (3) The specific time sequence of informational releases should be based upon local group conditions, concerns, understandings and seasonal activities.
- (4) The specific method of information sharing must relate to existing methods of dissemination as well as newly created one (if deemed necessary).
- (5) The initial setting of the project must be part of the planning with special reference to the ultimate goals of the project relative to the broader population.
- (6) Considerations relative to diffusion of information must include social characteristics of the population, organization of the population, how people allocate their time, human motivation, expected responses to incentives, and specific communications strategies.
- (7) Additional considerations when planning spread effect of information must include climate, environment, demography, time and space relationships perceptions, value system of the group, behavioral beliefs, political beliefs and the cultural atmosphere.

The core team of this project must be acutely concerned with the spread of knowledge, technical help and support relative to each satellite activity. It is reasonable to assume that the core activities will be centered in the location of the central government with later involvement in other government providences and districts as the satellite activities become operational.

Separate social soundness analysis papers relative to each satellite activity will speak to the issue of spread effects with specific plans for periodic assessment of accomplished spread. Satellite activities, upon becoming operational, must project spread effects for one year, three year and five year spans of time.

Leadership/Authority

Any discussion of leadership and authority in Yemen must be prefaced with a brief description of the social structure relative to leadership.

Yemen is in the middle of rapid social change. Economic forces are altering social life in ways that are not yet fully understood and for practical purposes are out of control. The country is a mixture of Islamic traditionalism, modern inventions, high levels of poverty, widespread new wealth, age-old elitism, new technology and primitive labor methods. The differences between urban and rural life or between living in the highlands or the lowlands can be the difference between living in the Fourteenth Century or in the Nineteenth Century. Briefly, Yemen appears to be a perfect place to observe the rapidity of change described so vividly in Future Shock by Alan Toffler.

The rapidity and extent of social change in Yemen is bringing about or will bring about a redefinition of leadership and authority roles. Some of the most significant changes which influence leadership are consumption patterns, immigration, remittances and the changing role of women.

Consumption patterns and the availability of consumer goods are modernizing lifestyles. Electrical appliances, radios, television sets, recorders and automobiles as well as other consumer items are becoming available for purchase. Increased income from the male work force outside the country provides the means for more people to buy the increased consumer goods. Social change which motorized vehicles bring about can only be estimated. The introduction of the radio or television into a village enables villagers to glimpse outside life and to acquire knowledge from sources other than traditional ones. Ultimately, the influences of non-village life may be seen in modifications of family patterns and/or authority.

Labor migration and remittances resulting from migration certainly contributes to the changing role of leadership and authority. The absence of a major portion of the male labor force in a village results in several possible spin offs. These spin offs may include one or a combination of items listed below.

- (1) The non-migrating male leadership in the village becomes stronger and the leadership position of those remaining males becomes more ingrained. When the migration force returns the leadership is strongly established and impossible to penetrate.
- (2) The remaining women, due to lack of sheer numbers of males, may be forced to take over previously male dominated roles of leadership or authority. The women may be in decision making roles.

- (3) Social mobility may become possible with changes in buying power of families and individuals. This mobility may result in higher classes who previously assumed leadership roles to enter the commercial sector of the economy. The same factors may allow the farmers to leave the subsistence sector by acquiring consumer goods, land and being able to employ additional labor.
- (4) More money may make education available to a large segment of society. Previously the elite were the only educated and were, therefore, the only ones suited for leadership roles. The increased education by more may also mean leadership roles for a larger variety of people.
- (5) Increased wealth may make it possible for nuclear families to exist separate from the extended family and the authority role of that group. Decision making may become decentralized as a result of such changes.
- (6) Remittances from labor migration instead of being invested in agriculture may be spent on motor vehicles, and business shops thereby taking the farmer out of the traditional role into a new merchant class role. The change in work roles, place of work and type of work may influence sources of authority for the new business man and his family. The survey by Richard Tutwiler, "General Survey of Social, Economic and Administrative Conditions in Mahweit Province, Yemen Arab Republic", revised December 1978 refers to a situation similar to the above described one in Adhra.

The role of women has been cited by several observers of Yemeni life as being one of recent change. Women still marry young at an average age of 14 years. Society expects women to have children. The national average is 6.8 live births per women. Side by side with these societal expectations is a real labor shortage due to the migration of husbands, fathers and brothers. The result is expected and practical with women taking over many traditionally male tasks. Nowhere is that more evident than in the rural agricultural labor force. The results of emigration and the recent progress in family spacing is expected to result in a decreased birth rate. This may result in children being less of a burden to the woman and may ultimately enable women to gain more economic power. The results may also mean more educational opportunities, more job possibilities and a freer social climate for women.

Increased buying power and the resultant increasing educational opportunities, changes in leadership roles, changing family authority patterns and modifications in traditional roles for men and women will change, modify or eradicate some of the existing social order in Yemen. What will happen in the future? What will result from these changing factors in Yemen in the near future or in the far future? Answers to these questions and to many others relative to changes and results in leadership and authority will require close observation of the changing social scene.

Patterns of Mobility

The most outstanding example of mobility in Yemen is the labor migration phenomenon. This extensive migration results in labor shortages with remittances sent to the portion of the population who stayed at home. Migration as it now exists in Yemen does not contribute significantly to the direct diffusion of innovation which is taking place within the country. The most obvious spread takes place when the men return with information, consumer goods and ideas from non-Yemeni areas in which they spent their term of migration. However, the point to be made here is that the bulk of information brought to Yemen are representative of a non-Yemeni culture. If the "outside" ideas and information coincide with information being fostered in Yemen then the combination will be strengthening. If, however, the men return to their local village with a belief in the advantages of slash and burn farming but the project being advanced in the village is poultry raising, the information will clash. In this example, the returnee may actually fight against the village project. Therefore, the spread effects relative to the migrant force cannot be "counted upon" as a positive meaningful method of dissemination of information. It would be beneficial for the project team to be aware of possible side effects of the large labor migration force.

Population density in 1975 was estimated to be eighty-eight persons per square mile. W. B. Fisher, a geographer, estimated the population distribution in various zones to be Tihama, with coastal towns, 20 percent; lower western slopes, 5 to 7 percent; higher western slopes, 33 to 35 percent; high plateau, 30 percent; higher Mashriq, 10 percent; and lower Mashriq, under 2 percent. The urban population lives chiefly in Sana, Taiz and Hodeida. Since the end of the 1970 civil war, there has been a population movement from rural to urban areas. The World Bank report, "Effects of

Migration of Rural Labor on Agricultural Development", which was based on the findings of a mission to the Yemen Arab Republic in February to March, 1979 refers to the rural to urban movement as one that happens universally in the process of development. The mission members consisted of J. Kozub, E. Greenshields and N. Khaldi. The pressure of an influx of rural population to urban areas will be reflected in increasingly limited urban facilities. This condition will probably become more acute as urban - rural migration gains in momentum.

There is evidence to support the theory that with more available motorized vehicles the traditional mobility patterns are changing. Increasing numbers of people are able to travel farther afield to buy and sell in the suqs. One cooperative in the village of Lawiyah near Hodeida has entered into a contract with the airlines to ship okra to Saudi Arabia for sale. The export arrangements were made by the village people which required extensive travel.

In some areas the weekly suq has given way to a permanent shopping district. Increased shopping opportunities may be contributing to increased mobility between the village and the market/shopping center.

Extensive travel appears to decrease somewhat during the fast period of Ramadan which takes place at different times from year to year. Personal contacts, on-site visits and the commencement of activities must be planned so as to take place considerably prior to Ramadan or after the fasting period is over. Additional time periods which should be avoided may include mourning periods (approximately three days), preparation time for pilgrimage to Mecca, village wedding feasts and other local festivities. Team members must be sensitive to local variations and plan alternative time schedules as routine.

In summary, the patterns of mobility which must be considered in the planned and unplanned diffusion of innovation are (1) labor migration patterns, (2) rural to urban movement and (3) changing patterns of personal mobility among the rural people.

Previous Project Design and Execution

According to the World Bank review draft of the agri-sector memorandum of June 1979 there are currently several sources of assistance being provided to Yemen Arab Republic. Specific programs and sources are detailed

in section 3.6 of Baseline Study and should be referred to if specific details are required.

Generally there are experts being provided in fisheries development, extension training in the Tihama, forestry in arid zones, desert locust control, livestock credit and processing, and agricultural engineering. Technical assistance projects include staffing the Taiz Central Agricultural Research and Training Project, help with Agricultural Extension and a Seed Introduction Program in the Tihama, the WFP Refugee Project, a rural development project in the Rada area, poultry production project, potato trials, seed production, agricultural services project, veterinary services, and a livestock disease diagnostic laboratory. Research assistance and/or studies include a feasibility study for irrigation rehabilitation in Wadi Rima, evaluation of knowledge of Tihama water resources, research of vegetables, wheat, foddercrops, maize, barley, sesame and other leguminous crop projects, Shoub Research Farm demonstration, Sorghum and millet improvement and other projects related to poultry, tropical and subtropical fruit improvement. The preceding listing indicates the large number of donor agency funded agricultural projects. The CID Title XII program, at this point in the planning stage, may overlap in various degrees some of the above listed projects but will not duplicate to a great extent. The aim of the CID program will be toward expansion of previous outreach programs with possible duplication in specific research situations only.

Maximum Information and Resource Distances

Specific information, knowledge, techniques, methods, and materials, which should be spread so as to designate the project as successful are varied. Definition of "successful" on this context is the maximum amount of population who will benefit from the project. Since the project consists of several satellite activities the particular type of information which must be spread and the distance which is considered optimum, must be related to each activity. (See Social Soundness analysis for individual satellite activities.)

C. Social Consequences and Benefit Incidence

The project is aimed primarily at the rural segment of Yemeni society. In addition the project proposes to help develop in-country resources so as to foster development in various segments of society.

Yemen is basically a country of rural dwellers with approximately 92 percent of the population living outside of the cities. The rural population is not scattered but rather the settlement pattern is one of villages which primarily developed in a particular way for defensive reasons. Some of the smallest villages may be primarily inhabited by members of a single extended family. However, one must guard constantly against making generalizations about the villages. The villages are scattered across a large and geographically diverse country with a varied governmental system.

The difference or distance between Yemeni social groups is strongly restricted in most cases. However, a certain amount of occupational flexibility is evident in some instances. Traditionally social classes have determined types of occupations, living patterns, marriage patterns, clothing etc.

There is a vast difference in the status of men and women. These differences are deeply traditional and supported by law and religion. Again, one must be cautioned against generalization as the decision making structure of the Sabr women appears to be quite different from that of the Hodeida tradition. Generally, female chores consist of care of livestock, planting, weeding, harvesting the crops and winnowing the grain. However, it appears that male labor migration has begun to force women to undertake traditionally male farm tasks in many instances.

In summary the specific satellite activities must be reviewed individually as to target groups, adversely affected groups and indirectly affected groups. (See Social Soundness analysis for individual satellite activities.)

Access to Resources and Opportunities

The project will enlarge access to resources and opportunities at various levels. A brief overview is contained in Table 3.

TABLE B. Social Soundness Analysis--Access to Resources and Opportunities

Activity	Specific Resources	Specific Opportunities
1. Core Team--Institutionalize a program planning, coordination and project evaluation capability in MOA	Planning and policy analysis; Project monitoring; Project evaluation; Agricultural census; Rural data study service; Marketing analysis; Agribusiness analysis	Evaluation Techniques; Upgrading staff capability; On-job Training; Education; Domestic University Internships
2. Agricultural Education a. Ibb School b. Surdud School	Educational and technical information for rural families. Input to L.D.A. program. Input into local Agrobusiness operations; Rural Development Planning	Education Future employment Upgrading skills
3. Women in Development--Home Economics Learning Program	Technical help for rural women relative to: (a) Food, nutrition, cooking and sanitation; (b) Clothing and home improvement; (c) Child care and human development; (d) Household management, crops and livestock; Informational source within villages	Education for paraprofessionals; Education for professionals; Part time employment; Full time future employment; On-job training
4. Sorghum-Millet Research	Research project data; Extension planning; Potential leadership; Yemeni training capacity; Improved Sorghum-Millet production	Participation in research; Learn Evaluation techniques; Education relative to: Extension methods; research methodology; continuing education programs
5. Agricultural Documentation and Learning Resource Center	Complete informational system Non-centralized information systems Available resources for field personnel	On site informational inputs
6. Agricultural Water Resources Program	Improved irrigation; On-farm water management techniques; Research project data; Technical help for farmers; TDY assistance to donor projects in relevant regions	Research; Demonstration sites Education; Planned programs
7. Poultry Extension	Technical help to rural people relative to poultry breeding, care, feeding and marketing. Increased production of poultry and poultry products	Participation in research; Upgrading skills; Education; Increased opportunities for employment

Employment

The exact number of Yemenis working and living abroad is not known. The World Bank Report by Kozub, Greenshields and Khaldi, 1979 estimates the number of migrant workers to be 700,000 which is 38% of the YAR labor force. Generally, the migrants fall into two groups: those who are working temporarily abroad and those who are out of the country on a semi-permanent or permanent basis.

H. Steffan in his mimeographed report, "Population Movement", describes the semi-permanent or permanent emigrants as those who have lost contact with their relatives in Yemen. He estimated these to be about 250,000 in 1975. In terms of social consequences and benefit incidences this long term migrant group would not be expected to receive any significant amount. It may be that some supposedly long term migrants may return to Yemen if they feel that they can make an adequate living. It may be anticipated that in order to acquire trained personnel to participate in the project activities some of the long term emigrants may consent to return and work in Yemen but this situation cannot be anticipated with any certainty.

The migrant group which may more directly receive the benefits from well developed functioning activities would be the short term migrants. Allman and Hill (Fertility, Mortality, Migration and Family Planning in the Yemen Arab Republic, 1977) estimated approximately 348,000 short term emigrants in 1975. Steffan et al (Final Report on the Airphoto Interpretation Project of the Swiss Technical Cooperation Service, Sanae, 1976) estimated 350,000 short term emigrants on the same census night. Other later estimates of short term emigrants disagree as to exact number but do agree that the number is growing.

The factors which stimulate rural labor migrations must be viewed relative to the possible effects a successful series of activities aimed at upgrading rural life may have upon that migration. One assumption may be that a percentage of potential migrants would not leave Yemen due to better financial conditions existing as a result of project development. Factors which appear to have stimulated rural

- (1) The urge to escape even temporarily from the insecurity of subsistence living based on agriculture.
- (2) An opportunity to find stable employment at a higher rate than possible in the YAR.
- (3) An opportunity to seek higher current income so as to improve welfare.
- (4) A strong incentive to migrate is to accumulate savings.

Kozub, Greenshields and Khaldi state that official remittances registered by the Central Bank has risen six fold in recent years, from 1 billion YRls in 1974/75 to 6 billion YRls in 1977/78. The projected amount for 1978/79 seems to be at the same level as the previous year.

- (5) An opportunity to earn money with which to buy consumer goods such as automobiles, trucks, household appliances and more imported foods.

The impact of migration on the agricultural productivity of the country is generally unknown in any definite way. Field survey work is needed in this area. The informal evidence relative to migration and Yemen agriculture supports the hypothesis that agricultural production has been compromised by the loss of workers due to migrant labor.

For example, L. A. Ross (Yemen Migration - Blessing and Dilemma, 1977) comments on the collapse of a tomato farm in the Tihama in 1977 due to the departure of 200 laborers. As a result of absent rural labor, agricultural wage rates have risen and imported Pakistani and other labor is now being used on some development projects.

Other results of the migration of labor include agriculture mechanization made possible by incoming remittances. This has proceeded with mixed success according to Birks and Sinclair (Aspects of International Labor Migration in the Arab Near East: Implications for USAID Policy, 1979). The tendency to change agricultural products from relatively labor intensive crops such as cotton or coffee has been apparent in recent years. These crops appear to be replaced by the growing of qat which is a labor cheap crop. The significance in this exchange of crops relates to the fact that coffee is an export and results in increased foreign exchange.

In summary, the project target group (basically rural families) which may be characterized by subsistence living based on agriculture will benefit from increased in-country employment. The increased

employment will, hopefully, result in or stem from increased agricultural products, better farm practices and/or the introduction of farm equipment. Quantitative data should be gathered at the beginning of the initiation of the program and later in three, five and ten year follow-ups.

The following Tables show the amount of migration and duration of the migration visits.

YEMEN ARAB REPUBLIC: DISPOSITION OF LABOR FORCE, 1975

Sector	Number	%
Farmer and Informal Sector	982,000	68.9
Modern Sector	90,200	6.3
Unemployed	63,600	4.5
Workers Abroad	290,100	20.3
Total	1,425,900	100.0

Source: Birks, J. S., Sinclair, C. A. and Socknat, J.A.,
Country Case Study: The Yemen Arab Republic (September, 1978)

YEMEN ARAB REPUBLIC: AVERAGE DURATION OF STAY OF MIGRANT WORKERS
 IN SAUDI ARABIA

<u>Year</u>	<u>Average Duration of Stay in Saudi Arabia (Years)</u>
1969	5.6
1970	7.4
1971	8.1
1972	3.5
1973	2.8
1974	2.4

Source: Birks, J.S., Sinclair, C.A., and Socknat, J.A.,
Country Case Study: The Yemen Arab Republic (September, 1978)

Rural displacement, migration and urbanization

The project does not in any way propose to physically displace any target groups. Activities are planned so as to enhance the target group's plane of living where they exist rather than move the group out of the rural area. Project objectives do not suggest rural displacement, increased migration or more urbanization. Specifically, the CID program is designed to provide continuity in implementing a long range development for agriculture and rural development. The emphasis is upon the establishment of research, training and extension capability in order to help plan and coordinate agricultural development in Yemen.

Specific research needed relative to the above topic should be planned in the early stages of the CID program.

Changes in power and participation

Any information relative to this topic would be pure speculation. To this writer's knowledge there are no studies of the magnitude required here which will help make such an assessment. Research is needed in order to gain baseline data about power structures and changes therein before subsequent research will be valid in terms of trends or changes.

D. Target Group

Description of Target Group

The target group of the overall CID Title XII Project is the rural population of Yemen and, more specifically, the farmers and farm laborers within the rural population. Swanson, in his study entitled "The Consequences of Emigration for Economic Development in the Yemen Arab Republic" (1978), estimated that, traditionally nearly 90 percent of the population have earned their livelihoods from agriculture or animal husbandry. With increased migration, that figure has probably somewhat decreased. Nevertheless, the percentage of people engaged in agriculture is significant. The 1975 census figures indicate 800,000 farm households in Yemen.

Most farmers live in small villages based primarily upon agricultural production or in towns which are basically distributive commercial centers. In a few instances the farmer may live in an isolated house or in an extended family compound. The farmer may own the land he cultivates or he may be involved in some system of sharecropping.

Crops differ with geographic regions. Farmers grow sorghum, wheat, barley, fruits, millet, potatoes, tomatoes and lentils in the highland areas. The major crops in the wadi areas are cereals, sugar cane, corn and tropical fruits. On the Tihama plain the major crops are dates, tobacco, cotton, millet and sorghum. Most farmers also raise a variety of livestock. Cash crops are coffee and qat with qat gaining in popularity. Farmers who live near a developed road have access to a wider marketing area. In addition, small settlements along major routes receive services such as electricity which are not yet available to many towns isolated from major roads.

In describing the typical Yemeni farmer, one must distinguish between the male farmer and the female farmer on the basis of the different tasks each performs. Men usually are more involved in planting, harvesting and marketing the cash crops than in other crops. Women have traditionally been involved in a variety of subsistence activities in addition to standard homemaking chores. They care for animals, gather fodder and fuel, hand water, plow the fields, harvest, weed and collect manure. All members of the family labor during harvest time. Traditionally herding is undertaken by the children, and families may combine their flocks for herding and grazing. The farm laborer works for wages on another person's land. The female farm laborer earns approximately 3/4 of the male wage which may be in currency or a share of the crop.

Health care facilities are extremely limited in rural areas. Basic information about such subjects as nutrition, child care, sanitation practices and improved agricultural practices is not available. Radios and television are becoming more common and, in many cases, provide the only information the family receives outside of traditional sources.

Problems of Target Group Members

Yemeni farmers face many problems, among the most important of which are:

- (1) During recent years farmers have been required to cope with and adjust to sudden rapid changes in almost every aspect of farming, and such changes have been a source of confusion and difficulty for many farmers.

- (2) The diet of the Yemen people has undergone change in recent years with the introduction of more imported foods. This in turn has created profitable opportunities for farmers to grow new crops and vegetables to satisfy this demand. Unfortunately, there are few, if any, sources of information on how to grow these new crops and vegetables, resulting in some farmers experimenting, with mixed results, and others not being prepared to take the risk.
- (3) Sharply increased emigration rates from Yemen have resulted in labor shortages and high labor costs. As a direct consequence, many farmers are unable to employ laborers in the fields with a resulting loss in production or reduced income for the farmers.
- (4) Forests and range lands are diminishing in size and quality, while fuel is becoming scarce and expensive. Little effort is being made to conserve resources or to encourage such conservation.
- (5) Money remitted from abroad by emigrants to Yemeni farmers has enabled the farmers to purchase new farm equipment. However, purchases are often based upon inadequate information leading to the purchase of unsuitable equipment. For example, the use of large tractors in the terrace areas have contributed to the physical breakdown of the terrace walls.
- (6) There is no national water policy in Yemen, nor is there any large range water resources planning. As a result of improper well spacing and pumping, the water table is being lowered and farmers are forced to dig deeper and more expensive wells. New methods of irrigation are needed to conserve and utilize the water supply as efficiently as possible.
- (7) Additional roads and motor vehicles have afforded farmers the opportunity of sending their produce to larger markets thereby permitting them to obtain higher prices. Many farmers have not taken full advantage of these increased opportunities owing to lack of knowledge of market planning and lack of assistance in developing cooperative farms and marketing systems.
- (8) Other problems which impinge on members of the farmers' families include malnutrition, inadequate health care, high infant mortality rates, diseases and lack of education.

Recommendations

Any program designed to help Yemeni farmers improve their agricultural practices and ultimately the entire rural population of Yemen, must be an integrated one which considers all aspects of agriculture and their interrelationships. Nevertheless, a priority listing of projects should be developed based upon the needs perceived by the farmers themselves, which may necessitate different initial projects in each region and even in each village.

Programs should be designed with long-term improvement objectives and should be developed in a step sequence which build upon the existing knowledge and skill bases of the farmers, since a basic rule of introducing new methodology and information is start with the known and gradually proceed into the unknown on a sequential basis. Furthermore, in order to be successful, each program should attempt to incorporate with the modern technology as many of the existing practices, customs and traditions as possible, in order to minimize the cultural impact, and to maximize the likelihood that the Yemeni farmers will accept and become involved in the programs, and cooperate in their implementation.

Local leaders, both formal and informal, should be fully informed of and involved in the planning of proposed programs. Since both men and women are involved in agriculture in Yemen, it would be advisable to engage both men and women as program personnel. For example, it would serve no useful purpose to train only men in poultry care when poultry are cared for by both women and men. Optimally, all information should be provided to both men and women or, if this is not possible or practical, at least directly to the persons who will be involved in a particular function.

E. Summary

Generally, the proposed program will require extensive social interaction between program staff and host country personnel. The host country contacts will cover a broad spectrum, from individual farmers, male or female, to personnel from the Ministries of Agriculture and Education. Social impacts are likely to be significant.

The program satellite activities are planned so as to provide research, training and extension support systems for rural families with attention being directed towards the concerns of men, women and children. These activities are likely to lead to an upgrading of the quality of life in rural Yemen, with the benefits being felt in increased production, improved labor practices, additional knowledge and an increased feeling of self-worth.

APPENDIX E
TO
CORE PROJECT PAPER

PROPOSED SATELLITE ACTIVITY
WOMEN IN DEVELOPMENT - HOME ECONOMICS
LEARNING PROGRAM
(WID HELP)

**MICROFILMED FROM BEST
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Submitted by:
Jean Ruley Kearns
July, 1979

Memorandum

The attached information should be regarded as the first step in planning the proposed satellite activity, Women in Development - Home Economics Learning Program (WID HELP). Specific details would be developed from further study, discussions and interviews.

The next step in implementing this program should be to initiate discussions with the appropriate ministries. For various reasons this writer did not discuss this program with any one at the Ministry level. However, in informal discussions at the Ministry of Education with the Office of Women's Education and with Mr. Elias (UNESCO) an awakening commitment to women's needs was apparent.

Several aspects of this program could be linked with other proposed projects. For example, the WID HELP program and the Catholic Relief Services proposal, which involves paraprofessionals in village health training, would complement each other. Both projects could be extended if a linkage were accomplished.

OUTLINE OF INFORMATION

	<u>Page No.</u>
I. Preface	E-1
II. Objective Statement	E-2
III. Justification	E-4
IV. Explanation of Time Sequence	E-7
V. Budget Input	E-8
VI. Output	E-10
VII. References	E-11
VIII. Attachment	E-12
List of Possible Contacts	

I. Preface

When researching, observing or discussing Yemeni agriculture, two topics surface repeatedly. One topic relates to migration of workers and the second topic concerns the Yemeni women's role in agriculture. Facts about migration relate to the large number of Yemenis going out of the country to work and returning with wealth in goods and/or increased buying power. Parallel to and related to the migration pattern is the historical agricultural role of women and the relatively recent increased involvement of women in agriculture. The question as to what is happening in the family structure regarding decision making at various levels while the male worker is out of the country has not been ascertained. Does the woman make decisions as to crops to plant, time of planting, sale of eggs, breeding of livestock and irrigation patterns? Does she also make decisions about children's health care, family expenditures, children's schooling and sale of produce? Answers to these questions are vital when planning Yemeni agricultural projects. If, in truth, women are making key agricultural decisions then help must be given to those women which will enable them to make the best decisions with the resources at their disposal.

Women involved in agriculture live in rural areas, relatively small villages or isolated compounds. Due to the traditional role of women, Muslim law and the lack of basic education as well as other factors the village woman does not go to city centers for educational information. Therefore, the information must come to the woman in her home setting.

Trained professionals are in scarce supply in Yemen and that is especially true among women. Furthermore, women with advanced training would be most reluctant to leave urban centers in order to live in a village for any length of time. One solution would be to train village women who would remain in their villages and spread the information.

The infrastructure proposed in this paper would consist of women para-professionals at the village level with trained professionals at a district level to provide support and on-going training. The district trained women would report directly to more highly trained professional women in the central government who, in turn, would provide information, training, leadership and support to the district and village women. In addition, the central government representatives would plan and implement research in relevant sub-

stantive areas, diffusion of information techniques and teaching methodology.

C.I.D. involvement would almost certainly be extensive during the initial phases of this proposed program. The C.I.D. involvement would be scaled down as Yemeni personnel received training and would, by the end of approximately six to eight years, consist only of technical help as requested by the host country.

II. Objectives Statement

The first long term program goal listed under proposed USAID strategy as set forth in its Country Development Strategy Statement: FY 1981 is as follows:

Goal 1: Expand equitable access to economic and social opportunities through human resources development. (1)

In the discussion of this goal the Strategy Statement refers to human resource development as "the backbone of AID's program". Further the discussion specifically designates importance to the quality of family life which is mainly dependent upon women. The concluding statement says, "Basic education for women thus provides a major leverage point."

The major objectives of the Women in Development - Home Economics Learning Program are as follows:

- 1) Increase the availability of and access to help at the local level for rural women.
- 2) Provide opportunities for YAR women to receive university level training abroad in four areas of concentration.
 - a. Extension and continuing education programs in home economics and agriculture.
 - b. Foods, nutrition, child care, clothing, and household management (instruction and research).
 - c. Vocational agricultural courses in poultry, water conservation, livestock and crop production.
 - d. Management, evaluation and administration.
- 3) Establish an information delivery system of national planners/administrators, district trainers and village paraprofessionals for service to rural women.

- 4) Provide opportunities for selected YAR wives of YAR students at American universities to receive paraprofessional training while in the United States for use in YAR upon their return.
- 5) Implement village level technical assistance programs, including but not limited to the following topics:
 - a - Foods and Nutrition. Specific topics: selection, care and preparation of foods, nutritional food values, sanitation methods, preservation of foods, and methods to improve the quality of food consumption.
 - b - Child Care and Human Development. Specific topics: prenatal care of mother, postnatal baby care, child nutrition, importance of breast feeding, sanitation methods, child growth and development, physical care, emotional needs of children and school readiness.
 - c - Clothing. Specific topics: techniques of sewing, improved methods of weaving, laundrying techniques, storage of clothing, selection, and clothing for special needs.
 - d - Household Management. Specific topics: planning sequence of work, care of equipment, cleaning and sanitation, marketing of products of women's labor, and methods for sharing child care responsibilities with other women.
 - e - Agricultural Subjects. Specific topics: care, feeding and reproduction of poultry, livestock information (depends on animals raised in specific areas), crop selection, planting and harvesting, water conservation, vegetable gardening, fruit tree development, and other related topics such as bee culture.

This proposed program would also attempt to meet two of the specific principal economic objectives of the YAR Government's Five Year Development Plan for the years 1976/77 - 1980/81. These objectives were summarized on page four of Report No. 2057a-YAR, Yemen Arab Republic Volume 1: The Main Report as follows:

"(a) Mobilize human resources and improve their skills through education and vocational training; ... (c) Develop the productive sectors, i.e. agriculture and industry"

III. Justification

The number of women living in rural areas of Yemen is a key piece of information in any discussion of women in agriculture. The following table includes information from the Central Planning Organization, The Housing and Population Census of February, 1975 (2).

Table A. Number of Population by Sex and Percentage of Rural

Governorate	Population	Males	Females	Percentage Rural
Sana	807,269	393,806	413,463	85.0
Taiz	873,869	397,794	476,075	91.0
Hodeidah	676,693	342,039	334,664	88.2
Dhamar	455,132	212,198	242,934	95.8
Ibb	799,518	375,342	419,176	97.6
Al-Mahwit	174,639	80,601	94,038	98.6
Hajja	390,352	190,101	200,251	98.5
Sada'a	153,461	72,411	81,050	97.3
Mareb	40,896	20,277	20,619	99.3
Beida	157,764	70,864	86,900	45.0
Total	4,519,593	2,150,433	2,369,160	90.0

The above figures should be considered somewhat low but the importance of these figures is in the ratio of men and women and the resulting large percentage of women in rural areas. The Office of International Health (3) estimates that approximately 700,000 people were not counted in the above figures, of which approximately 163,800 were women, and that the sex ratio is approximately 85 percent, which reflects the decreasing proportion of Yemeni men in the country. The population is relatively young with approximately 47 percent under age 15. The resulting picture is of a country with significant percentage of women in rural areas, and a large number of children.

The migration of men out of Yemen into jobs, mainly in Saudi Arabia, has been a statistic much discussed relative to women entering agriculture. This kind of "trade off" (i.e. males leaving the country and women taking over

agricultural pursuits) is most certainly operating in some families. The study by Myntti (4) argues, however, that women have always played a critical role in subsistence agriculture. She maintains that men control cash crops such as qat, coffee and grapes but that women have a dominant role in grain production. Carapico and Hart in their study support the view that women have always participated in agriculture and are currently moving into plowing activities. Women play a major role in poultry and livestock rearing, water hauling, fodder and fuel gathering, craft manufacturing and marketing. While agriculture has declined because of migration, it is a reasonable assumption that the decline would have been greater if women had not taken over the heavy agricultural chores such as plowing. Regardless of which studies cited, the presence and importance of women's contributions to the area of agriculture in Yemen cannot be ignored.

In addition to assuming an expanded role in agriculture, the wife of a typical migrant husband also experiences increased family resources in terms of remittances and new consumer goods. Traditional buying patterns are further influenced by increased roadways, imported consumer goods and mass media advertising. The results may be dramatic as evidenced in the preliminary report on infant feeding by El Dahor and Greiner (6). Studies by A. K. Said (UN World Health Organization), A. Bornstein (UN Food and Agriculture Organization) and Michael C. Latham and Theodore Greiner (Cornell University) indicate that the nutritional status of YAR infants is at a critical low level. The introduction of commercial infant foods and the increased family wealth with which to buy the bottle food has resulted in an increase of "bottle baby disease". This disease is often more clearly observed in countries which are beginning to make socio-economic progress. The result is increasing numbers of mothers switching from breast to bottle feeding with a corresponding stagnated relatively recent and as such may be less entrenched and less immune to intervention. Infant nutrition may be improved by means of expanded crop and livestock production in addition to informational help.

The possibilities of involving women in poultry production are clearly practical as evidenced by the "Woman's Poultry Survey" conducted by Judith Obermeyer (7) in Al-Mahweit. In this survey, 40 of the total sample of 66 women were currently raising chickens. The entire sample had raised chickens in the past six months. In addition to supplying their own families with eggs and poultry meat, the women indicated that they sold approximately 30% of the

eggs. Based on the current selling price and practice in 1978, the projected value per month for 400 women in home egg production was approximately 24,000 YR. Obermeyer concluded that the egg industry in Mahweit offers much potential for women's economic activity and should be viewed as an important resource for development. Tradition supports women's role in egg and poultry production, thus encouraging the integration of women into the village economic system. Poultry care is a priority often mentioned by women and, as such, meets a major criterion for selection as a non-formal education topic. It has been assumed that the information contained in this survey can be generalized so as to indicate practices and needs of women in other districts.

Both women and men are generally unaware of good health practices, with basic sanitation unheard of in many geographic areas. While the government and donor agencies are attempting to improve and increase health care facilities, without good health practices within the home, the new facilities will be in a position somewhat similar to "closing the barn door after the horse has run away".

Perhaps the strongest statement of need to train women in basic home economics skills at the village level appears in "Rural Development in the Yemen Arab Republic: Strategy Issues in a Capital Surplus Labor Short Economy" by Cohen and Lewis (5) with reference by Mynetti's studies.

"While women are not in control of means of production it does appear their ideas are taken into account. Some believe they are respected for their knowledge and managerial capacity while Carapico and Hart note that men do not understand women's activities and communications between the two sexes is minimal. If males in family migrate, wife will need a male relative to handle contacts with commercial sector. Male extension agents may not be able to reach them. Projects that seek to bring women into cash markets may not work. Carapico and Hart recommend that more mobile women (usually divorced or widowed) be trained in poultry, husbandry, vegetable, cereal and health or nutrition skills and used to reach other women, primarily through existing female communications channels which they find to be quite workable. They also see a need for mother-child clinics and efforts to help female craftsmen organize for supplies and sales."
(Page 43)

IV. Explanation of Time Sequence

10

The program should begin with the identification of a program leader, experienced in similar programs, such as EFNEP, and who can work well with people of the host country. The first task for this woman would be planning and research of certain fundamental questions. The activity leader would plan in cooperation with the C.I.D. core team, the home university of the program, A.I.D. personnel and host country personnel.

As the basic plan and program thrust are being developed, the first four Yemeni women to attend a University in the United States would be selected.

After the Yemeni women have completed approximately one semester of course work at an American University, a workshop should be conducted at a C.I.D. University for selected wives of Yemeni male students attending C.I.D. schools. This workshop would serve several purposes: (1) to field test various teaching methods; (2) to model communication techniques for the two Yemeni professionals; (3) to give the Yemeni professionals practical experience; and (4) possibly to train some of the wives to take a village paraprofessional position upon their return to Yemen. The two American graduates of the University would be closely involved in the entire activity with their final year of academic work spent in Yemen helping set up the program and conducting research.

The rest of the activity steps should be clear from the time sequence part of this paper.

V. Budget Input

The budget was prepared upon the assumption that district trainers and village paraprofessionals would be paid by the Yemeni Government and/or L.D.A.s. It is also assumed that the YAR would take over the payment of the trained professionals and supplement their GRA payments while in the United States and the Yemen Arab Republic. This budget must be viewed as a rough draft with refinements becoming possible as the details of the program are developed.

V. Input (Estimated only)

	1979/80		1980/81		1981/82		1982/83		1983/84		1984/85		1985/86		1986/87		1987/88		1988/89		Total Program	
	FTE No.	\$	FTE No.	\$	FTE No.	\$	FTE No.	\$														
On-campus																						
Faculty	6	17,500	6	19,250	9	25,025	9	27,527	9	30,278	6	21,195	3	11,000	3	12,100	2	9,000	2	9,900	55	182,775
GRA - U.S.			12	8,000	12	8,000															24	16,000
GRA - YAR			48	34,000	48	32,000															96	66,000
YAR Hourly			2	3,000	2	3,000																6,000
Workshop Instructors			2	4,500	2	5,000															4	9,500
In YAR																						
Res. Assoc. (U.S.)							24	29,000	24	29,000											48	58,000
Res. Assoc. (YAR)							24	29,000	24	29,000	24	29,000	24	29,000							96	116,000
Total Personnel	6	17,500	70	68,750	73	73,025	57	85,527	57	88,278	30	50,195	27	40,000	3	12,100	2	9,000	2	9,900	327	454,275
Other Direct Costs (U.S.)																						
Training Materials		1,000		5,000		5,000		5,000		5,000		5,000		5,000								26,000
Visual Aid				5,000		5,000		5,000		5,000		5,000		5,000								25,000
Total Other Direct Cost		1,000		10,000		10,000		10,000		10,000		10,000										51,000
Other Directs Costs (YAR)						20,000				20,000				25,000								65,000
Equipment such as:																						
Sewing machines																						
Pressure cookers																						
Flw, hoes																						
See keeping equip.																						
Looms, pipes																						
Plastic hose																						
Hatchery Equip.																						
Consumables such as:																						
Seeds, poultry med.																						
Fertilizer																						
Paper, bees																						
Total Other Direct Cost YAR						20,000				20,000				25,000								65,000

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TOTAL ALL COST: \$570,275

VI. Output

12

In addition to fulfilling the stated objectives, this program may be expected to produce the following results when operational:

- (1) Eight well trained Yemeni women who will be capable of assuming leadership roles in the program.
- (2) Research findings relative to teaching paraprofessional village women.
- (3) Trained regional women who will provide training, supervision and support for village paraprofessionals.
- (4) Research findings in areas related to proposed program work.
- (5) An on-going program aimed at providing in-village help for women in agriculture, foods and nutrition, clothing and housing, human development and sanitation.
- (6) Increased agricultural production in villages where the program is operating.
- (7) Better informed village and rural women.
- (8) Spin-off outputs may include helping more women and girls aspire to increased education, an enlarged Home Economics Learning Program, more technicians available for help at the village level and a youth program.
- (9) Hopefully, a better quality of life for as many people as possible in Yemen.

- (1) Country Development Strategy Statement: 1981: Yemen, USAID, Sana, January, 1979, p. 42.
- (2) Central Planning Organization, The Housing and Population Census February 1975, Preliminary Results, second edition.
- (3) Office of International Health, U. S. Department of Health, Education and Welfare, Public Health Service, "The Yemen Arab Republic Synchrisis" by Juliana Weissman, March, 1978.
- (4) Myntti, Cynthia, "Report on Female Participation in Formal Education, Training Programs and the Modern Economy in the YAR". Report prepared for USAID Sana, 1978.

_____ "Women in Rural Yemen". Paper prepared for USAID Sana, November, 1978.
- (5) Cohen, John M. and David B. Lewis. "Rural Development in the Yemen Arab Republic: Strategy Issues in a Capital Surplus Labor Short Economy". Development Discussion Paper No. 52, February, 1979.
- (6) El Daher, Samar and Ted Greiner. "Preliminary Report, Infant Feeding and Health in Udain". Report prepared for Norwegian Save the Children Project with YAR Ministry of Health. May, 1979.
- (7) Obermeyer, Judith A. "Woman's Poultry Survey". Report prepared for American Save the Children Program. December, 1978.

14

VIII. Attachment: List of Possible Contacts

The following is a partial listing of persons who should be contacted while planning this program:

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