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AGRICULTURAL SECTOR ANALYSIS,  
YEMEN ARAB REPUBLIC

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## PREFACE

"In the Land of the Blind, the One-Eyed Man is King"

This agricultural sector analysis for the Yemen Arab Republic was conducted "in country" during the summer of 1981. The Consortium for International Development arranged for Dr. J. B. Wyckoff, Professor of Agricultural and Resource Economics, Oregon State University, to head the effort with the able assistance of Dr. James M. McCullough, Associate Professor of Marketing, University of Arizona, and Mr. Hassan Sharafuddin, economic consultant to the Ministry of the Economy, Yemen Arab Republic.

Appreciation is due to the many government officers, expatriates representing United Nations agencies and donor governments, and the many Yemeni citizens we talked with concerning their country's agricultural problems and prospects. A World Bank Agricultural Sector Team headed by Wade Gregory, assisted by Elco Greenshields, John Allchin, Nabil Saoud and Alan Savory cooperated fully with the CID team to the mutual benefit of everyone. Access to the poultry, citrus and integrated crops and water management project teams and the USAID resident staff and library materials contributed to the breadth and depth of the analysis.

The CID/Core project resident staff administered by Dr. Royal Brooks and Mohammed Sharaf Al-Din performed "above and beyond the call of duty" in providing logistical support, secretarial services, transportation and translation. Their gracious attention to our "off duty" periods was very much appreciated, and helped create the environment which has led the non-resident analysts to positively anticipate their next visit to the Yemen Arab Republic.

The efforts of those analysts who have preceded us in the YAR have contributed to our analysis as we have drawn extensively upon their insights. We trust that those who follow may benefit from our efforts presented here.

## I. INTRODUCTION

The revolution to replace the Imam as the ruler of the Yemen Arab Republic (YAR) began in 1962. When reconciliation was reached by the warring factions in 1970, YAR was opened to the rest of the world for the first time in decades. A modern nation is now developing at an unprecedented rate. The large sums from donor nations and United Nations agencies, combined with remittances from hundreds of thousands of Yemenis working in other countries, has generated effective demands that can only be supplied by imports. As a consequence this country, which ranks foremost among all of the Arabian Peninsula as an agricultural area, now finds itself importing almost YR 2 billion of foodstuffs and animals annually. What happened to its food self-sufficiency? And is it possible to regain its domestic food security?

YAR agriculture is characterized by small, fragmented, family owned farms, often with terraced fields on the slopes of spectacular mountains. These fields have traditionally been cropped to sorghum and millet. But the Yemeni farmer exhibits a very high degree of economic rationality. When off-farm income opportunities are better, he goes to Sana'a or emigrates from the country, leaving his wife and family to run the farm. Within the farming enterprise, if he finds higher paying crops, suited to his farm, he shifts to horticultural crops or to the growing of qat. If installing irrigation systems, usually pumping groundwater, guarantees good crops, he readily invests the necessary capital if available. The capital flow from remittance income is used to improve his housing, to buy another wife and hence another farm, to purchase farm equipment, a motor vehicle, or perhaps to increase his level of consumption.

The Yemeni farmer readily accepts new crops if field experiments prove them to be viable. But he hangs onto the traditional sorghum and millet varieties, which have proven effective over many centuries. He adopts the

use of fertilizer, herbicides and pesticides if it has been demonstrated that they improve the yields and his profit position, and responds to mechanization similarly. He sells his products through the local souk (market) to local residents, or to wholesalers who assemble the product locally for transport and sale in the major population centers at prices that are high by international comparisons. While market roads are noticeably poor, gat farmers show great ingenuity in moving their product rapidly to market, since it must be marketed within hours of harvest. Yemeni farmers are fiercely independent and look the part with djambias at their waists and AK-47's over their shoulders, yet the Yemeni people are a friendly people.

Those of us charged with doing an Agricultural Sector Analysis within this environment find ourselves asking, "What is the problem?". These farmers have little, if any, unemployed labor. They have access to capital either from emigrant family members or from the Agricultural Credit Bank. They face a market demand that exceeds domestic agriculture's ability to supply it and have relatively unfettered access to those items they need to import. Commercial broiler operations using absolutely the latest technology and producing hundreds of thousands of birds are present in the YAR. There are areas where the average farm family income ranges from YR 300,000 to YR 400,000 per year. Adequate rainfall and good groundwater supplies that virtually guarantee good crops exist in some areas.

There are problems, however. Many farmers are less fortunate. Plots that are too small, fragmented holdings, inadequate or unpredictable rainfall, insufficient irrigation water, declining water tables, virtually nonexistent market roads, village water systems that are nonexistent or impure, needed health services that are not available, areas where schooling is yet to be initiated and technology is, as yet, unknown, can be found in virtually all parts of the country.

While an understanding of the alternatives opened up in the last ten

years is evident among the people, the infrastructure to facilitate realistic access to them is missing in much of the country. Cultural and religious values developed over the centuries sometimes are not compatible with the indicated changes. With few formally trained individuals, effective adoption of new technology proceeds relatively slowly.

### I.1. Basic Approach

An Agricultural Sector Analysis, by definition, is a study of the major components of agricultural production, distribution and utilization systems and the environment within which they exist. Linkages of the agricultural sector with other sectors of the economy are identified in such an analysis and the impact of changes in related sectors upon agriculture is analyzed. The institutional framework within which agriculture operates, the physical and human resources at its disposal, and the social and cultural values held by agriculture producers and rural people are identified, since, in general, they largely determine the potential development of the agricultural sector. Such an Agricultural Sector Analysis tends to be more useful if it remains problem oriented.

Since Yemen's agriculture is constituted primarily of small independent farming units, it would have been desirable to treat them as simultaneous production and consumption units. Such a procedure would have permitted many insights into the types of changes that would be expected as the forces impinging upon agricultural production change. However, much of the necessary information, such as the allocation of families' time on a twenty-four hour basis for a period of twelve months, together with the allocation of available natural and capital resources, does not exist. Thus, the possibility of gaining insights as suggested by Huesmann, "into the significance of specific health constraints, a general perception of work/leisure preferences, 'nonproductive' activities (e.g., wood gathering, water supply)

which offer greatest potential for amelioration, work/education preferences, etc.", could not be realized. (Huesmann, no date) Such information would have been very useful in projecting the probability and rate of adoption of new technology requiring the reallocation of time and resources within the producing-consuming household. The possible shift of productive agricultural activities from men to women, as alternative opportunities for men encourage their absence from the farming operation, could have been examined.

Seasonal data on the availability and cost of hired labor would have been most useful for predicting changes in the agricultural production function. This information also was not available. The cyclical nature of labor requirements (and of some biological processes) would have required that such data be collected over a period of at least a year to be most useful in determining which crops would likely be included in a given production system. Since such information was not available, the authors of this study utilized available time series data on selected variables, attempting to rationalize the changes observed and presenting the most likely scenario.

This study concentrates on those factors that are current or potential impediments or that can improve the access to Yemeni farmers to necessary inputs, information, alternative crops, new technologies, or output markets. The analysis attempts to pinpoint those factors most limiting to the expansion of agricultural production.

## 1.2. Procedure

Review of past studies and materials was meticulously pursued. Considerable information was available on production, but there seemed to be little data on the marketing system for the output from YAR farms. This necessitated visits to local souks, discussions with assemblers and wholesalers and visits with Yemeni farmers concerning their marketing problems. Prices for the major agricultural commodities were checked. In the case of livestock, live

prices, as well as retail meat prices, were obtained. Systematic data, however, was not available on the factors that affect farm gate prices or market access for small farmers.

Production inputs availability and the market structure for inputs were also examined. Many government and private agencies were visited, including the Central Bank and branches of the Agricultural Credit Bank, the Tihama Development Authority, and the Southern Uplands Rural Development Project. Concerns relating to the timely availability, cost and level of adoption of various inputs were examined. Visits were made to several demonstration farms, donor developments, and the citrus experiment station at Jarubah. The technology developed or demonstrated by these and the research center visited at Taiz have important implications for the potential of YAR agriculture.

Although research output is extremely important, the process of delivering this information to producers who can utilize it is even more important. Information on this concern was gathered by visits to the Tihama Development Authority, the Southern Upland Rural Development Project, the training school at Ibb and Sana'a University. The lack of trained persons capable of effectively disseminating information was a major concern throughout the agricultural sector. This problem is accentuated because of the low level of literacy in most of the rural areas, particularly among women who are involved in agricultural production. The lack of information concerning who makes small farm production decisions, makes information dissemination to both men and women in the rural areas appropriate.

### I.3. Relationships to the Other Sectors

The importance of linkages of the agricultural sector with other sectors of the economy was emphasized by the analysts. Johnston and Kilby have stated, "the emphasis is on action to change the production possibilities available to farmers by modifying their institutional, technical and economic

environment". Thus, relevant sectors of the economy were examined noting recent changes.

The relationship of YARG economic policy, monetary policy, fiscal policy, and overall goals for development are of extreme importance to the development of the agricultural sector. Policy concerning the import and export of agricultural commodities is directly related to fiscal policy since the majority of the central government's revenues come from import duties. The analysts personally visited the appropriate government ministries as well as the Central Bank of Yemen.

General health conditions are extremely important, as is the status of education. The implications of the existing situation and probable changes were considered. Similarly, the demographic characteristics of the population were examined. Changes in the location and age/sex distribution of the population have definite impacts upon agricultural potential. The element of population emigration is recognized to have had a major impact upon changes that have occurred and changes that are likely to occur in the agricultural sector. Internal migration from rural to urban areas of the country has attracted less analytical attention but has significant implications for agricultural production because it affects rural labor supply.

#### I.4. Consistency of Goals

With the previous analysis as a background, the objectives for agriculture established by the YAR Ministry of Agriculture (MOA), the Consortium for International Development (CID) in their agricultural support program, and the United States Agency for International Development (USAID) in their program relative to the agricultural development of the Yemen Arab Republic were examined. Within the context of these goals, specific analyses, priority identification and recommendations were determined for CID's involvement in the agricultural and rural area development of the YAR.

Agricultural production, including fisheries; marketing, including the collection of statistics on the price information for inputs and outputs; farm budgets, including general information on the operation of the system; education and training, including the formation of the agricultural faculty at Sana'a University, the development of research capability, the provision of extension specialists, the training schools at Ibb and Surdud, specific projects to develop capability in audio-visual technology, and the relationship of the proposed programs to other existing or anticipated donor projects were considered, specifically.

This Agricultural Sector Analysis should prove useful to administrators of CID, YARG and USAID/Yemen in developing programs which will maximize output from limited resources in the development of the YAR. As better data become available, input from physical, biological and natural scientists is brought to bear and additional experience is gained, the program for supporting agricultural development can be updated and improved. This Agricultural Sector Analysis should be a continuous effort involving trained Yemenis as well as TDY experts. Such a planning framework will increase the effectiveness of CID's program in the YAR.

## II. THE ECONOMIC ENVIROMENT

The Yemen Arab Republic is a different economy than often encountered in the developing countries. The wealth rests in the private sector, because the central government is not sufficiently strong to enforce heavy taxation. Thus, the infrastructure throughout the country is lagging relative to the development of the private sector. Gross Domestic Product has increased 142 percent in the last five years (Table II.1.). The fastest growing sectors have been finance, import duties, and construction.

Table II.1.  
Structure of Gross Domestic Product  
(Current Market Prices, YR Million)

	1975-76	1976-77	1977-78	1978-79	1979-80
<b>Industries</b>					
Agriculture, Forestry and Fis'ing	2,011	2,313	2,409	3,049	3,458
Manufacturing	257	301	381	504	655
Construction	283	477	796	1,045	1,022
Public Services	209	286	409	509	618
Wholesale and Retail Trade Restaurants and Hotels	1,012	1,257	1,531	1,790	2,189
Financial Institutions	141	293	512	707	874
All others	239	313	373	503	644
Government and Non-Profit Services	523	584	877	1,223	1,528
Import Duties	394	929	1,304	1,386	1,670
Imputed Bank Charges	<u>-134</u>	<u>-266</u>	<u>-449</u>	<u>-645</u>	<u>-802</u>
<b>Total</b>	<b>4,935</b>	<b>6,487</b>	<b>8,220</b>	<b>10,166</b>	<b>11,919</b>

Source: CPO, 1981.

Agriculture's growth rate has been lagging all other sectors, but still constitutes 29 percent of Gross Domestic Product (GDP), Table II.2. This is down from more than 40 percent of GDP in 1975-76. Only the wholesale and retail trade at 18.4 percent contributes more than half as much as the Agricultural Sector.

*constant price?*

Table II.2.  
 Percent Contribution to Total Gross Domestic Product  
 YEAR, 1975-80  
 (Current Market Prices)

	1975-76	1976-77	1977-78	1978-79	1979-80
<b>Industries</b>					
Agriculture, Forestry and Fishing	40.8	35.7	29.3	30.0	29.0
Manufacturing	5.2	4.6	4.6	5.0	5.5
Construction	5.7	7.4	9.7	10.3	8.4
Public Service	4.2	4.4	5.1	5.0	5.2
Wholesale and Retail Trade, Restaurants and Hotels	20.5	19.4	18.6	17.6	18.4
Financial Institutions	2.9	4.5	6.2	7.0	7.3
All Others	4.8	4.8	5.5	5.9	6.1
Government and Non-Profit Services	10.6	9.0	10.6	12.0	12.8
Import Duties	8.0	14.3	15.9	13.6	14.0
Imputed Bank Charges	<u>-2.7</u>	<u>-4.1</u>	<u>-5.5</u>	<u>-6.4</u>	<u>-6.7</u>
<b>Total</b>	100	100	100	100	100

Source: CPO, 1981

Agriculture did not show the growth during the period that had been planned. Primarily because of its failure to grow together with disappointing performances in transport and communications and, particularly, trade, the actual growth rate of the GDP averaged only 6.4 percent rather than the planned 8.2 percent, Table II.3.

Table II.3.  
Planned and Actual Growth Rates of Real GDP by Sector  
YAR, 1976-77 - 1980-81  
(At compound annual percentage rate)

	Planned	Actual
Agriculture	5.5	0.0
Industry	11.7	14.8
Building and construction	14.4	14.1
Transport and communication	11.3	8.9
Trade	10.1	2.9
Finance and banking	9.5	31.5
Housing	3.7	3.9
Government services	10.0	10.5
Other services	<u>7.5</u>	<u>8.3</u>
GDP	8.2	6.4

Sources: CPO, 1981; UN Economic Commission for Western Asia (ECWA), 1977.

Budgeted government capital expenditures are 18 times as high for 1981 as they were in 1975-76. Those areas showing the greatest percentage increase include health, education, defense and economic services. Health, as the percentage of the total capital expenditures, comprises only 6 percent, education 14 percent, defense 19 percent and economic services 22 percent. Capital expenditures for agriculture have increased over 23 times during this period but still constitute less than 4 percent of the total government capital expenditures. In recent years, the government capital expenditures have been approximately equal to government current expenditures, Table II.4.

Table II.4.  
Government Capital Expenditures  
YAR, 1975-76 - 1981  
(YR millions)

	Actual					July-December <sup>a</sup>		Budget
	1975-76	1976-77	1977-78	1978-79	1979-80	1979	1980 <sup>a</sup>	1981
General public service	54.6	93.6	150.0	212.5	181.8	65.5	61.4	343.2
Defense	29.2	58.4	110.2	911.0	479.9	346.4	40.0	600.0
Education	9.1	32.7	72.8	140.0	168.8	67.9	110.5	433.5
Health	3.4	7.9	33.2	57.9	81.7	33.8	46.6	199.2
Community and social services	4.6	12.3	30.8	58.6	67.0	39.8	7.6	87.4
Economic services								
Agriculture	4.6	15.1	33.5	32.7	45.0	12.5	29.2	110.0
Mining	--	0.2	5.5	--	--	--	--	--
Construction	14.7	37.2	136.9	142.9	180.5	83.1	180.0	372.3
Transportation and communication	10.9	15.5	32.7	62.7	209.8	17.3	108.7	205.2
Commerce	0.1	1.5	8.1	13.8	6.1	1.0	2.7	7.8
Total	30.3	69.5	216.7	252.1	441.4	113.9	320.6	695.3
Capital transfers <sup>b</sup>	38.8	140.9	276.4	404.0	513.0	356.4	345.0	758.0
Budgeted capital expenditure	170.0	415.3	890.1	2,036.1	1,933.6	1,023.7	931.7	3,116.6
Development expenditures financed externally <sup>c</sup>	191.1	188.1	276.9	581.6	558.8	140.4	304.4	900.0
Total	361.1	603.4	1,167.0	2,617.7	2,492.4	1,164.1	1,536.1	4,016.6

Source: Data provided by Ministry of Finance

a. Provisional

b. Capital transfers as recorded in the YAR budget documents include external loan repayments which have been excluded here. Capital transfers have in some years included transfers to public sector enterprises for current purposes.

c. Counterparts of commodity and project loans, which are not included in the official budget document.

Investment, meanwhile, has been increasing at an approximate 17 percent rate in the private sector and 33 percent in the public sector. The private sector invested 55 percent of the total during this period. Total investment in real terms increased over 10 times. The big gainers percentagewise were building and construction, and industry. The big loser was housing. Agriculture comprised 6.7 percent of the total in 1975-76 and 7.4 in 1979-80. These rates of growth in the late 1970's were possible because of the increase in remittances from workers outside of the country and foreign capital inflows, Table II.5.

Table II.5.  
Gross Fixed Capital Formation by Sector  
YAR, 1975-76 - 1979-80  
(At constant 1975-76 prices, YR millions)

	1975-76	1976-77	1977-78	1978-79	1979-80	Percent of 1979-80 Investment
Agriculture	57.3	65.7	164.3	224.9	198.1	7.4
Industry	52.3	210.6	329.9	429.5	302.1	13.8
Building and construction	9.8	42.3	134.1	143.8	261.5	6.2
Transport and communication	219.5	200.3	555.2	713.6	852.0	26.4
Housing	415.0	587.0	675.0	733.0	661.0	32.0
Other sectors	<u>95.1</u>	<u>117.8</u>	<u>331.4</u>	<u>422.2</u>	<u>406.6</u>	<u>14.3</u>
Total	849.0	1,223.7	2,189.9	2,667.0	2,681.3	100.0

Source: CPO, 1981.

The actual rate of fixed investment in the first five year plan did not always meet planned investment. During the first four years of the plan, less than half of the planned fixed investment in agriculture was actually made. Industry did only slightly better. This has very serious implications, as these sectors are depended upon to provide the majority of the new jobs and increased productivity, and to sustain economic growth in the future, Table II.6.

Table II.6.  
Ratio of Actual to Planned Gross Fixed Investment by Sector  
YAR, 1976-77 - 1979-80  
(Percent)

	1976-77	1977-78	1978-79	1979-80	1976-77 to 1979-80
Agriculture	43	51	3	37	46
Industry	78	61	6	36	55
Building and construction	132	184	7	225	191
Transport and communication	58	90	7	66	74
Housing	192	220	18	130	176
Other sectors	<u>76</u>	<u>108</u>	<u>8</u>	<u>54</u>	<u>75</u>
All sectors	97	101	9	66	84

Sources: CPO; UN Commission for Western Asia, 1977

Domestic public savings combined with official transfers to the YAR exceeded the level of investment during the mid 1970's and a surplus funding capacity developed. Increases in public investment beginning about 1977, together with a slowdown in domestic public savings, led to a shortfall in 1978-79. This would indicate that the level of public investment may have to be curtailed or the government must find ways of increasing its revenues or economizing on its current expenditures. While government revenues have been increasing faster than the growth of current expenditures, current public investment has far outstripped the surplus.

#### II.1. Government Revenues

Government revenues have increased 127 percent in the last five years. While they declined in 1979-80, a strong comeback was staged in 1980-81, Table II.7.

Table II.7.  
Government Revenues, YAR, 1976-81  
(YR Millions)

	1976-77	1977-78	1978-79	1979-80	1980-81 <sup>a</sup>
Finance Office	59.69	74.05	89.40	123.39	157.44
Taxation Department	133.21	234.88	314.88	349.27	529.53
Customs Department	912.94	1,247.94	1,348.88	1,520.69	1,941.30
Zakat	20.43	25.56	19.74	21.66	34.81
Others	<u>307.87</u>	<u>1,588.64</u>	<u>1,378.20</u>	<u>427.07</u>	<u>586.89</u>
Total	1,434.14	3,171.08	3,151.10	2,442.08	3,249.97
Index 1976-77 = 100	100	221	220	170	227

a. Estimated from data for the first two quarters.

Source: Central Bank of Yemen, 1981.

While the greatest rate of increase in tax collections has come from income and profit taxes, they still constitute only 6 percent of the total revenue. All other sources have increased at approximately the same rate with the majority of the revenue coming from foreign trade duties (63 percent) and nontax revenues (19 percent), Table II.8.

Table II.8.  
Changes in the Composition of Government Revenues  
YAR, 1975-1979  
(1975-76 = 100)

	1975-76	1976-77	1977-78	1978-79	Percent of Total	
					1974-75	1978-79
Direct Taxes					<u>8</u>	<u>10</u>
Zakat	100	150	275	325	4	3
Income & profit taxes	100	174	433	600	4	6
Indirect Taxes					<u>71</u>	<u>71</u>
Foreign Trade	100	236	331	351	58	63
Taxes on Goods & Services	100	136	358	325	12	8
Non-Tax Revenues	<u>100</u>	<u>195</u>	<u>341</u>	<u>375</u>	<u>21</u>	<u>19</u>
Total Revenue	100	214	328	362	100	100

Source: Central Bank of Yemen, 1979.

## II.2. Government Expenditures

Total current government expenditures have about quadrupled through 1979-80. Defense, Public Services and Education are the big spenders, representing 87 percent of the total, Table II.9.

Table II.9.  
Government Current Expenditures, YAR, 1975, 1975-76 - 1981  
(YR millions)

	Actuals					July-December		Budget 1981
	1975-76	1976-77	1977-78	1978-79	1979-80	1979	1980 <sup>a</sup>	
General public service	180.8	235.3	368.6	523.8	758.8	334.3	370.7	1,036.9
Defense	304.5	430.5	545.5	794.1	1,027.9	443.6	659.2	1,333.4
Education	51.6	63.3	147.2	287.7	400.0	137.9	198.9	694.4
Health	22.2	29.6	52.8	77.4	98.4	38.7	52.8	152.7
Community and social services	14.1	17.0	25.3	40.1	87.2	52.4	34.7	142.5
Economic services	34.1	54.7	95.6	107.1	136.9	66.2	77.2	247.6
Agriculture	2.6	4.0	8.5	10.4	16.7	11.0	9.9	25.4
Interest on public debt	<u>9.2</u>	<u>10.6</u>	<u>15.4</u>	<u>17.0</u>	<u>22.1</u>	<u>11.0</u>	<u>13.8</u>	<u>20.0</u>
<b>Total</b>	<b>616.5</b>	<b>841.0</b>	<b>1,250.4</b>	<b>1,847.2</b>	<b>2,531.3</b>	<b>1,084.1</b>	<b>1,407.3</b>	<b>3,627.5</b>

a. provisional

Source: Data provided by Ministry of Finance

The expenditure items with the highest rates of growth were Education, Agriculture and Social Services. However, they only comprise 17, 1 and 14 percent respectively of the 1979-80 expenditures, Table II.10. While Agriculture contributes 29 percent of the Gross Domestic Product, it attracted only 4 percent of the planned Government Capital Expenditures and less than 1 percent of current government expenditures.

Table II.10.  
Changes in Government Current Expenditures  
YAR, 1975-81  
(1975-76 = 100)

	1975-76	1976-77	1977-78	1978-79	1979-80	% of Total	
						Expend. 1979-80	Budget 1981
Public Services	100	130	204	290	374	28%	486
Defense	100	141	180	261	334	42%	479
Education	100	123	285	558	777	17%	1,758
Health	100	133	238	349	432	4%	1,275
Social Services	100	121	173	284	613	4%	1,129
Economic Services	100	160	280	314	396	6%	1,364
Agriculture	100	154	327	400	635	1%	1,781
Unallocatable	100	115	167	185	163	1%	117
Total Expenditures	100	136	203	300	394	100%	757

Source: CPO, 1981; and data provided by Ministry of Finance

In terms of the overall budgetary trends, current revenues increased at an annual growth rate of 45 percent, while current expenditures increased at 35 percent for the ten year period ending in 1979-80. Capital expenditures increased at a 45 percent rate during this period. Revenue and expenditures were equivalent to only 6 and 14 percent of GDP respectively in 1970-71, while these proportions increased to 19 and 34 percent respectively in 1979-80.

Currently 41 percent of the government expenditures are going for wages and salaries. Thirty-five percent goes into capital expenditures. General expenditures are 10 percent of the budget, current transfers 8 percent, while

7 percent goes for capital transfers, Table II.11. The net government position (revenues minus expenditures) has been deteriorating rapidly. A surplus of YR 958,000,000 was present in 1977-78, but this had declined to a negative balance of YR 3,773,000,000 in 1980-81. This emphasizes the need for the government to reassess its policy relative to revenue generation or level of expenditures.

Table II.11.  
Government Expenditures by Item, YAR, 1977-81  
(YR Millions)

	1977-78	1978-79	1979-80	1980-81 <sup>a</sup>
Salaries, etc.	812.83	1,215.04	1,741.76	2,885.89
General Expenditures	301.80	423.93	622.11	674.92
Current Transfers	127.29	309.60	352.21	549.91
Capital Expenditures	676.66	1,537.92	1,600.98	2,453.17
Capital Transfers	294.36	226.26	312.91	458.69
Total	2,212.94	3,712.75	4,629.97	7,022.58
Index 1977-78 = 100	100	168	209	317
Net Government Position (Revenues-Expenditures)	958.14	-561.65	-2,187.89	-3,772.61

a. Estimated from data for the first two quarters.

Source: Central Bank of Yemen, 1981.

Substantial overall budget deficits are in prospect for the 1980's. Yet perhaps the most appropriate general action is for priority to be given to improving the collection of existing taxes. Increases in tax rates, though possibly appropriate in certain areas, may, in others, have an adverse effect on revenue if they significantly hinder improvements in compliance. Completely new taxes should be considered only where administration is simple and revenue potential is substantial.

### II.3. International Trade

Indirect taxes provide the major source of revenue for the government, with foreign trade taxes alone providing 63 percent of total current government revenues in 1978-79. Thus, the importance of trade and trade policy cannot be overestimated.

The purchasing power generated primarily by worker remittances has increased the demand for imported goods tremendously. The total value of imports increased 351 percent from 1975-76 through 1979-80. Three categories of imports comprised 81 percent of the total imports in 1979-80. These were foodstuffs and live animals, manufacturers' materials, and machinery and transportation equipment. These three import categories comprise 25, 23 and 32 percent respectively of the total value of imports, Table II.12.

Table II.12.  
Non-Government Major Imports, YAR, 1975-80  
(YR 000's)

	1975-76	1976-77	1977-78	1978-79	1979-80	Percent Change
Foodstuffs & live animals						
Live animals	9,513	13,813	17,509	24,368	40,842	329
Meat & meat products	3,831	30,469	123,264	177,371	222,727	5,714
Dairy products & eggs	34,627	69,525	122,990	196,016	341,721	887
Fish & fish products	7,125	16,667	13,407	25,448	30,691	331
Cereals & products	235,126	296,700	234,816	220,194	400,388	70
Vegetables & fruit	70,407	180,356	220,783	370,401	504,034	616
Sugar, products & honey	242,141	166,579	132,295	245,378	235,289	-3
Coffee, tea & spices	48,055	29,881	77,899	55,788	73,202	52
Miscellaneous foodstuffs	90,080	64,962	38,644	52,860	45,990	-49
Total	741,589	868,352	981,594	1,304,830	1,894,634	155
Beverages and tobacco	44,375	48,985	85,634	110,489	114,600	158
Raw materials, inedibles	6,599	12,689	19,814	15,933	35,271	434
Mineral fuels & lub.	81,118	58,897	108,037	138,492	369,508	356
Animal & vegetable fats	7,852	11,200	28,357	32,164	42,460	440
Chemicals	82,834	155,335	223,069	301,957	473,640	472
Fertilizer manf.	6,849	3,536	17,315	25,059	20,936	206
Manufacturer's materials	310,679	668,202	975,242	1,270,291	1,780,511	473
Machinery & trans. equip.	289,561	965,678	1,155,414	1,581,363	2,474,532	755
Miscellaneous manufactures	140,413	243,043	339,651	313,326	465,901	232
Goods not classified	1,894	2,943	21,920	10,520	54,244	2,764
<b>TOTAL</b>	<b>1,706,894</b>	<b>3,035,329</b>	<b>3,938,732</b>	<b>5,080,364</b>	<b>7,705,302</b>	<b>351</b>

Source: CPO customs data, revised by Central Bank of Yemen.

Within the foodstuffs and live animal category, the greatest increase has been in meat and meat products. Dairy products and eggs, and vegetables and fruit have also shown considerable increase. Sugar products and honey actually declined during the five year period. Imported cereal and cereal products were primarily wheat and flour, which together comprised from 70 to 90 percent of the total category during the five year period.

Thirty percent of the YAR's imports came from the Arab countries, of which Saudi Arabia supplied 82 percent. Denmark supplied about two and one-half times as much value in foodstuffs and live animal imports to the YAR as compared to any other country. The Netherlands, the United States and the People's Republic of China were the next largest suppliers. India, Australia,

Japan and other Western European countries were also major suppliers in the foodstuffs and live animals category.

Yemen is primarily an exporter of labor and services and an importer of goods. Thus, the export section in terms of commodities is virtually non-existent. As a result, the trade account has been negative throughout the period, increasing 556 percent from 1975-76 to 1980-81. The total deficit was estimated to be over YR 7,000,000,000 for 1980-81. The majority of the items exported are agricultural products. Hides and skins, coffee, biscuits and confectionaries comprised 96 percent of the identified exports for 1978-79. In the past, both coffee and cotton had comprised major export commodities. However, cotton production has declined to a point where the country is now importing cotton. Coffee is being replaced by other crops, primarily qat, thus its production is declining too. The people of the Democratic Republic of Yemen and Saudi Arabia receive most of the exports from YAR. These two countries received 48 and 24 percent respectively of the total exports during 1979.

The Ministry of Supply has a primary responsibility in the international trade sector. It is their responsibility to be sure that plenty of food is available for the people of the YAR. At the present time, most of this food is brought in on a continual basis, as the only significant storage is for grain at Hödeidah. The Ministry of Supply determines the quantity of food import items needed within the country. Once this is set, 40 percent is set aside to be purchased by the General Corporation for Foreign Trade, with the rest being allocated through tenders, which can be submitted by anyone. The successful bidders are issued licenses to purchase the quantities indicated.

Domestic production of certain products is protected from competition by preventing the imports from coming into the country. Total prohibition is the responsibility of the Ministry of the Economy. Those imports permitted

in the country are subject to duty ranging from zero to over 100 percent of the import value. The import value upon which duties are paid is calculated by determining the dollar value of the shipment and multiplying it by a factor of five to establish the value in Yemen rials upon which the duties must be paid. Since the official exchange rate is YR 4.5 per US dollar, the actual duties will run more than 10 percent higher than the indicated schedule.

Taxes on imports have three elements:

- . Customs duties at various rates as specified by customs tariffs;
- . A defense tax levied at 5 percent of all nonexempt imports;
- . A statistical tax levied at 2 percent on all nonexempt imports.

In addition, a surcharge of 2 percent of the total duties payable is collected and transferred to CYDA for distribution to the Local Development Associations.

The structure of the customs tariff reflects attempts to accommodate a wide variety of different objectives including the raising of revenue, protection of domestic industry, keeping prices for household necessities reasonable, and discouraging smuggling. As a consequence, tariffs on manufactured goods vary from 1 to 35 percent, with the lower rates for industrial inputs and capital goods and higher ones for finished consumer goods, especially those regarded as nonessential.

Tariffs announced in January, 1981 set customs duties for most animals, meat products and milk at 10 percent, 30 percent for most textile products, and 50 percent for carpets. The rate on fresh or chilled vegetables is 100 percent, oils and fats 25 percent, sugar 13 percent, mineral water 40 percent, soft drinks 40 percent, and cement 23 percent, Table II.13. All export duties on agriculture products have recently been cancelled.

Table II.13.  
Duties on Selected Agricultural Commodities  
(Effective September, 1981)<sup>a</sup>

Commodity	Type of Duty <sup>b</sup>			Total
	Customs	Defense	Statistics	
Meat, frozen	10	5	2	17
Eggs	1	5	2	8
Apples, fresh	20	5	2	27
Bananas, fresh	20	5	2	27
Oranges, fresh	20	5	2	27
Poultry meat, frozen	15	5	2	22
Vegetables, canned	25	5	2	32
Vegetables, fresh	100	5	2	107
Milk, powdered	nil	nil	nil	nil
Milk, fresh	10	5	2	17
Margarine, etc.	25	5	2	32
Wheat	nil	nil	nil	nil
Wheat flour	nil	nil	nil	nil
Sugar	13	5	2	20
Rice	8	5	2	15
Day old chicks	10	5	2	17
Butter	5	5	2	12
Cheese, white	5	5	2	12
Cheese, other	25	5	2	32

a. Customs duty schedules are reviewed each 6 months.

b. Levied as percentage of ad-valorem C.I.F. @ \$1 = YR 5.0.

Source: Ministry of the Economy, Government Customs Office, by T. P. Allchin, September, 1981.

It must be recognized that many goods are smuggled both across the northern land border and along the Red Sea coast. The main problem seems to be with tobacco, cigarettes, motor vehicles, gasoline, and small, high value items such as watches and cameras. Reductions on tariffs on motor vehicles from 60 to 50 percent for passenger cars and 75 to 50 percent on motorcycles were designed to increase legal importation, thus tariff revenue. Tariffs on tobacco and cigarettes, however, increased from 70 to 120 percent. Incentive to smuggle cigarettes is further enhanced by the domestic excise tax levied on both local and imported cigarettes.

The Customs Department, located in the Ministry of Finance, is responsible for the actual collection of the duties. They also have the respon-

sibility to control smuggling, which is quite common because of the high duties on certain products. The Ministry of Supply has advocated that duties be minimized in order to reduce smuggling.

It is interesting to note that Yemeni consumers prefer domestically produced products over imported products in many, if not in all, cases. Examples are retail prices of locally produced, factory-type broilers present in the market for YR 20, while a small, native bird is seen in the same markets selling from 36 to YR 40. Similar price differentials exist for imported and domestic wheat. Such differentials make utilization of import duties as a mechanism for raising the price of imported goods to encourage the production of domestic goods rather doubtful. Duties would have to be raised to such a level that the primary result would probably be an increase in smuggled goods and a decrease of officially entering goods (see Chapter 3).

#### II.4. The Financial Sector

The financial sector is composed of the Central Bank, ten commercial banks, four specialized banks, three insurance companies, and an investment finance company. In addition, an extension of the financial system includes the exchange dealers, who remit workers' savings to and from Yemen, and the traditional money lenders.

In the commercial banking sector, the government sponsored Yemen Bank for Reconstruction and Development has 80 percent of the banking business. It is the only bank that has branches outside of Sana'a, Hodeidah and Taiz, with 23 branches.

There is a definite tendency for a high proportion of the domestic private sector's savings to be held as currency relative to other financial assets. In the most recent year, currency accounted for 75 percent of the increase in money. Most of the currency put into circulation arose from

inward remittances in the course of which foreign claims were presented to the Central Bank for domestic currency.

→ The four specialized banks, the Agricultural Credit Bank, the Industrial Bank of Yemen, the Housing and Credit Bank and International Cooperative Development Bank, are heavily dependent on the government for financing. Except for the ACB, which currently obtains 28 percent of assets from foreign sources and 24 percent from the Central Bank of Yemen, they obtain virtually none of their money from the domestic, private sector. However, they do deposit unloaned balances in commercial banks. These specialized banks have sometimes been accused of failing to lend their total available funds because of the sacrifice of interest from their deposits in commercial banks.

Commercial bank lending is concentrated in short-term lending for import financing. Banks are reluctant to engage in anything but short-term lending because the prevailing interest rate structure, combined with the 20 percent reserve requirement, makes the effective interest cost to banks of time and savings deposits beyond nine months maturity greater than the maximum they are allowed to charge for loans.

The real cost to the bank of three month time deposits is 13.75 percent; three to six month, 15 percent; six to nine month time deposits, 16.25 percent; and nine to twelve month deposits, 17.5 percent. Since the lending rate maximum is only 17 percent, it is understandable why banks are reluctant to take time deposits beyond six months in length.

The interest rate structure in commercial banks has not until recently generally reflected the market rates in other countries. Advances to government had been at 4 percent. Commercial loans had varied from a low of 10 percent to a high of 15.5 percent the last few years. Currently, it is 17 percent. Mortgages and personal loans have been established at the same interest rates, Table II.14.

Table II.14.  
Interest Rate Structure for Deposits and Credits  
YAR, 1975-81  
(percent)

Effective Date	1975	1978	1980			1981	
	April	April	February	April	July	November	May
<b>Central Bank</b>							
Interest on Treasury bills	3	3	3	3	3	3	3 <sup>b</sup>
Advances to government	4	4	8	8	8	8	8 <sup>b</sup>
Discount rate for commercial banks	--	--	12.5	14.5	11	14	16
<b>Commercial banks</b>							
Maximum lending rates							
Commercial advances <sup>a</sup>	12)	10	13.5	15.5	12	15	17
Mortgage and personal loans	14)						
Minimum deposit rates							
Time deposits							
Three months	6	6.5	8.5	10.5	7	10	11
Over 3 to 6 months	7.5	7	9.5	11.5	8	11	12
Over 6 to 9 months	8	7.5	10.5	12.5	9	12	13
Over 9 to 12 months	9	8	11.5	13.5	10	13	14
Savings deposits	5	6	8.5	10.5	7	10	11
<b>Specialized banks</b>							
Lending rates							
Short-term	9	7	10.5	12.5	9	11	11
Medium- and long-term	8	6	9.5	11.5	8	10	10

- a. Excluding some cotton and manufacturing credit, for which slightly lower rates were applicable.
- b. The rate for general advances is 8 percent; the rate for investment projects is 4.5 percent.

Source: Central Bank of Yemen.

On the savings side, the interest rates on three-month savings were 6 to 6½ percent until 1980. In the latest time period, they were increased to 11 percent. Nine to twelve month savings ran 8 to 9 percent until recent times, when they were moved to 14 percent. Savings deposits were 5 to 6 percent but are now 11 percent. As mentioned earlier, because of the 20 percent reserve requirement on all deposits of commercial banks, the maximum rate of interest that can be charged by the banks on loans is not sufficient to cover the rates of interest that must be paid on nine to twelve month savings. Thus, savings are not accepted by the banks beyond six months in the present situation.

The strong growth of imports for private consumption and the ambitious development projects by the Government is only possible because of the inward remittances from emigrant Yemenis. Unless a reduction in the growth of domestic consumption and/or a significant increase in the growth of domestic outputs occurs, balance of payment deficits will occur. Thus, both domestic production and economic development, in the longer run development of the balance of payments, are crucially dependent on the growth of domestic savings and their efficient channeling into productive investment. Interest rate policy has an important role to play in achieving of these two goals.

The high rates of inflation during the 1970's reflected the fact that the supply of goods from domestic and foreign sources could not keep pace with the growth of the money supply and credit. During this period, interest paid to savers was low relative to the current rate of inflation. At the same time, interest paid by borrowers was also relatively low compared to the rate of inflation. Thus, the savers were subsidizing the borrowers to a large extent. It was not surprising that demand for loans far exceeded the supply of savings. Further, it is not surprising that the savings rate in the Yemen Arab Republic is low, amounting to perhaps 5 percent of the Gross National Product.

The nominal rates of interest versus the real rates of interest for the last ten years indicates that the real interest costs for borrowing has been negative while the real interest return for savers has also been negative. Thus, while savers lost real value of their savings at a rate of 16.29 percent per year for the period 1970 through 1979, those who were borrowing money actually gained on the real value of their loans at a rate of 15.4 percent per year during the same period. Only in 1981 has the real rate of interest for savers become positive while the real cost to borrowers has been positive for the last two years, Table II.15.

Table II.15.  
Nominal & Real Interest Rates, YAR, 1972-79  
(Percent)

	Rate of Inflation <sup>a</sup>	Interest Return <sup>b</sup>		Interest Cost <sup>c</sup>	
		Nominal <sup>d</sup>	Real <sup>e</sup>	Nominal	Real
1972	--	6	--	10	--
1973	42	8	-34	10	-32
1974	27	8	-19	12	-15
1975	23	9	-14	12	-11
1976	27	9	-18	12	-15
1977	25	9	-16	12	-13
1978	20	8	-12	10	-10
1979	22	8	-14	10	-12
1980	15	13.5	-1.5	15.5	+0.5
1981	10.5 <sup>f</sup>	13	+2.5	15	+4.5

a. General Consumer Price Index, Rate of Change

b. 12 month savings deposits

c. Interest charged on commercial loans

d. maximum rate permitted

e. Nominal rate minus the rate of inflation

f. Estimates

Source: Central Bank of Yemen, 1981; and CPO, 1981.

This situation would tend to indicate that a sizeable upward revision of interest rates was warranted if the financial sector's contribution to economic development to increase financial savings was to be realized. It appears that this situation may have reversed itself in late 1980 and early 1981. At this point, real savings turned positive for the first time while the real interest costs also became positive. If the real return to savers increases so that it is competitive with alternative investments of similar risk, then savings can be expected to increase. This will provide more lending capability to the banks and result in more lending unless opportunities for essentially risk free Euro-dollars or US dollar investments lure the money out of the country.

Two specialized financial institutions have been created to channel money below commercial interest rates into areas deemed important in the development plan. These are the Agricultural Credit Bank to channel money into agricultural development, and the Housing Credit Bank, assigned to help provide for housing loans. Both of these credit sources appear to be more important from the standpoint of resource allocation than for the existence of preferential loan rates. Stated differently, at commercial conditions, there would remain a constraint on the supply side and not a lack of demand for these areas of development. There is also an externality in the case of

the Agricultural Credit Bank where attractive loan rates can lead to a more extensive use of the land and can help reduce the exodus of rural population into the cities and neighboring oil states. In the case of the Housing Credit Bank, the conspicuous lack of adequate housing throughout the country obviously makes the provision of such housing a social goal that can justify subsidization in one form or another.

However, it appears that projects are being financed at a subsidized rate by the Industrial Bank of Yemen that would have no difficulty attaining financing from commercial banks at commercial rates. Thus, while preferential interest rates to guide resource allocation may be deemed desirable, they involve political choices. Further, if rates paid for deposits in these specialized banks is not competitive, the banks will become merely "credit windows" as has happened in many developing countries. The concessional loan rates imply that these institutions need to be subsidized either directly by covering their operating losses or indirectly by supplying official domestic and/or foreign, low cost financing which reduces their average cost of funds.

The extremely low rate at which the government borrows from the Central Bank excludes it from borrowing from the commercial banks. By borrowing from the Central Bank, the government creates new Central Bank liabilities, i.e., government deposits. Once the government spends these deposits, part of the proceeds will be held by the domestic commercial banks as reserves. With these reserves, the commercial banks are able to expand their deposits by a multiple, with the end result of a potential expansion of the money supply. If the government were to borrow from commercial banks, there would be no creation of a Central Bank's liabilities upon which to build multiple expansion of the money supply. Thus borrowing from the Central Bank has a more expansionary impact on the money supply than borrowing from the commercial banks. This may add to the rate of inflation and increase adverse trends in the balance of payments.

## II.5. The Monetary System

The total money supply in the YAR has increased 166 percent from 1975-76 to the first half of 1980-81. However, the rate of increase has been slowing. The change in money supply from 1974-75 to 1975-76 was 120 percent. This declined in subsequent years to 74 percent, 22 percent, 16 percent, and finally 4 percent in the first half of 1980-81, Table II.16.

Table II.16.  
Selected Financial Data, YAR, 1975-81  
(YR millions)

	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81 <sup>a</sup>
Money supply	2,509.1	4,370.4	6,205.1	7,583.1	8,822.9	9,179.6
% change from previous year	120%	74%	42%	22%	16%	4%
Demand deposits	347.9	620.9	767.4	747.3	677.9	688.0
% change from previous year	105%	78%	25%	-3%	-9%	1%
Time, savings & foreign currency deposits	318.7	422.0	636.0	873.3	927.1	1,160.2
% change from previous year	145%	32%	51%	37%	6%	25%
Foreign assets (net)	2,607.3	4,106.4	6,119.0	6,883.1	6,873.8	6,263.1
% change from previous year	120%	57%	49%	12%	0%	-9%

a. First two quarters only

Source: Central Bank of Yemen, 1981.

Meanwhile, demand deposits doubled in the same period of time. However, the rate of change from the previous year has been constantly declining, actually becoming negative in 1978-79 and 1979-80. Time savings and foreign currency deposits have increased 264 percent during this period. Again, while the rate of change has varied considerably, it has been generally decreasing.

Finally, foreign assets increased 140 percent from 1975-76 to the first half of 1980-81. However, again the rate of change from the previous year

has declined from 120 percent for the period 1974-75 to 1975-76 to -9 percent the first half of 1980-81. This indicates that expenditures are exceeding present revenues and, thus, foreign assets are being drawn down.

Agriculture does not borrow money from commercial banks. Less than one percent of the total advances of commercial banks have gone into agriculture in any one year. Advances for imports absorb the majority of the commercials' funds but have declined in recent years as a percentage of total advances. In contrast, advances for manufacturing, industry, and private and professional loans have been increasing as a percentage of total advances, Table II.17.

Table II.17.  
Advances of Commercial Banks, 1975-80  
(YR Millions & Percent)

	1975	1976	1977	1978	1979	1980
	%	%	%	%	%	%
Agriculture	--	--	0.48	0.80	0.61	0.12
Export	7.43	6.36	1.38	1.04	0.40	0.24
Imports	71.14	64.80	71.82	70.02	62.71	55.83
Manufacturing	2.15	0.28	1.31	5.31	7.64	6.88
Industry	1.98	2.86	1.69	4.46	5.25	6.29
Business	12.90	14.20	13.32	7.82	9.14	11.31
Private & professional	4.26	11.38	8.80	8.80	9.00	14.87
All other	0.15	0.13	1.20	1.74	5.23	4.46
Total Advanced:						
	1975	1976	1977	1978	1979	1980
	356,132	529,194	1,455,628	1,387,951	1,849,386	2,219,916

Source: Central Bank of Yemen, 1981.

## II.6. Balance of Payments

The current account, positive for the first three years of this period, turned negative in 1978-79 and has been increasingly negative since then. Net receipts have varied within a fairly narrow range within the last five-year period. While the remittances (net receipts) indicated in the balance

of payments have been about constant in current value the last few years, there are reasons to believe that they may be undercounted. It is believed that more and more of the remittances are being brought into the country in the form of goods purchased abroad because of lower prices. These values are not recorded. Also, import trade via overland routes is not currently financed by the commercial banks. The value of this trade also bypasses the recording system. The total value of these leakages is not known.

The capital account has shown steady growth throughout the period, increasing by about seven times. However, the balance of payments has shown considerable deterioration since 1977-78, going negative for the first time in 1979-80. This would indicate that the YR is overvalued and that some major policy changes may have to be made if the trend in the balance of payments continues, Table II.18.

Table II.18.  
Balance of Payments, YAR, 1975-81  
(YR Millions)

	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81 <sup>a</sup>
Current account	1,100.4	1,257.4	1,472.7	-621.3	-1,480.4	-1,761.5
Trade account	-1,166.4	-3,199.9	-4,102.7	-5,613.2	-6,925.5	-3,825.1
Exports	55.3	83.9	31.8	13.8	32.1	45.1
Imports	-1,721.3	-3,283.8	-4,134.5	-5,626.4	-6,957.6	-3,870.2
Private sector	-1,452.4	-2,992.1	-3,529.2	-4,419.1	-5,570.7	-3,343.7
Government imports	-268.9	-291.7	-605.3	-1,207.3	-1,386.9	-526.5
Net receipts	2,766.4	4,457.3	5,575.4	4,991.9	5,445.1	2,063.6
Capital account	199.0	188.2	340.4	932.5	1,301.8	773.4
Net private capital movement	123.0	53.5	199.5	452.8	169.4	377.1
Balance of payments	1,422.4	1,499.1	2,012.6	764.0	-9.2	3.7

a. First two quarters.

Source: Central Bank of Yemen, 1979 and 1981.

The trade account has shown a growing deficit with private sector imports growing at a faster rate than public sector imports. The overall marginal propensity to import has averaged 1.5 during the past five years,

Table II.19.

Table II.19.  
Changes in Balance of Payments, YAR, 1975-81  
(1975-76 = 100)

	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81 <sup>a</sup>
Current account	100	114	134	-56	-135	-320
Trade account (-)	100	273	352	481	594	656 -
Exports	100	152	58	25	58	163
Imports (-)	100	191	240	327	404	450
Private (-)	100	206	243	304	384	460
Government (-)	100	108	225	449	516	392
Net receipts	100	161	202	180	197	149
Capital account	100	95	171	469	654	777
Net private capital movement	100	43	162	368	137	307
Balance of payments	100	105	141	54	-1	1

a. Data from the first two quarters doubled to estimate annual change.

Source: Calculated from data from Central Bank of Yemen, 1979 and 1981.

#### II.7. National Disposable Income

Disposable income, in nominal terms, increased by 135 percent from 1975-76 to 1979-80. However, the increase was less than 25 percent in real terms due to the high rates of inflation that prevailed during this period. As a consequence, per capita disposable real income has remained relatively constant at around YR 1,400, Table II.20.

Table II.20  
National Disposable Income and Gross National Product, Selected Years  
(YR Millions)

	1969-70	1975-76	1977-78	1978-79	1979-80
Domestic factor income	1,156	4,370	6,555	8,328	9,661
Net inflow of factor incomes and other current transfers from the rest of the world	248	2,752	5,714	5,679	-6,182
Indirect taxes less subsidies	48	462	1,471	1,593	1,967
National income	<u>1,452</u>	<u>7,584</u>	<u>13,740</u>	<u>15,600</u>	<u>17,810</u>
Savings	-98	2,001	4,846	3,609	3,466
Private consumption	1,434	4,902	7,652	10,205	12,154
Government consumption	116	681	1,242	1,786	2,190
Capital consumption allowance	27	103	194	245	291
Gross national product	<u>1,479</u>	<u>7,687</u>	<u>13,934</u>	<u>15,845</u>	<u>18,101</u>
Implicit deflator for GDP (75-76 = 100)	19	100	146.4	170.1	188.7
Disposable income (75-76 = 100)	1,452	7,584	9,385	9,170	9,438
Per capita disposable income (YR) (75-76 = 100)	--	1,257	1,470	1,395	1,396

Source: CPO, 1981.

Somewhat unique to the YAR economy, as compared to most developing countries, has been the net transfer from the rest of the world, which has contributed between 23 and 32 percent of the total disposable income in dollars during this period. The relative importance of these transfers has been declining in recent years. It appears that the value in current dollars has tended to stabilize in the last several years at around YR 5 billion. This would seem to indicate that the domestic economy will need to accelerate its rate of growth if per capita real income is to be maintained or increased.

Private consumption growth continues to outstrip the growth of private domestic disposable income. This has resulted in domestic dissaving in the private sector. Combined with the leveling off of the net inflow of remittances and transfers, this led to a small financing gap in 1978-79. The marginal propensity to consume in the private sector has been estimated in recent years to be 1.18.

## II.8. Summary of Macro-Economic Factors

The first five year plan (FFYP) had anticipated an increase in the GDP at a compounded rate of 8.2 percent. Actual growth had been at a 6.4 percent rate during the first four years of the FFYP. The largest sector of the economy, agriculture, has shown no growth.

The agricultural sector only captured 7.4 percent of the growth in total gross fixed capital between 1975-76 and 1979-80. The sector realized only 46 percent of the fixed investment planned for it during this period. The total economy saw 84 percent of the planned investment accomplished. Likewise, agriculture received less than 2 percent of the government capital expenditures during this period.

Meanwhile, government revenues increased 127 percent and expenditures were up almost 300 percent. The net surplus position at the beginning of the period had become negative by 1979-80. The government current expenditures for agriculture had increased over five times, but still comprised less than 1 percent of the total expended in 1979-80. In light of the above, it is not surprising that the agricultural sector's contribution to GDP declined from 41 percent in 1975-76 to 29 percent in 1979-80. Still, it contributes approximately 60 percent more to GDP than the next largest sector.

The value of imported goods increased more than  $3\frac{1}{2}$  times from 1975-76 to 1979-80. Agricultural and food products currently comprise  $\frac{1}{2}$  of this value. The ability to purchase this quantity of imports is generated by remittances from Yemenis working in other countries, together with foreign capital inflows for development and other purposes. Duties collected on these imports provide more than 60 percent of all government current revenue.

Agricultural and food commodities make up virtually all of YAR's exports, but equal just over 1 percent of the value of imports. Thus, the balance of trade has increased  $5\frac{1}{2}$  times since 1975-76 and is running a current deficit of about YR 7 billion. This situation, together with a current account that

has turned negative the last three years, resulted in YAR's first balance of payments deficit in 1979-80. This situation may become chronic unless policies for stimulating the domestic economy, discouraging imports or increasing foreign transfers are adopted.

With foreign remittances leveling off and several forces at play indicating that actual declines may be in prospect, with some indication that United Nations programs may eventually be withdrawn because the increased level of per capita income has moved the YAR out of the "poorest of the poor" category, and the likely unwillingness of the Yemeni people to give up their access to imported products that they have learned to enjoy, the most acceptable solution would seem to be an increase in domestic production. Agriculture, because of its current underdeveloped status, may provide the best opportunity for growth in the domestic economy.

### III. THE AGRICULTURAL SECTOR

#### III.1. Introduction

The YAR is divided into regions for analysis in several ways. Statistical data produced by government agencies are generally organized by governorate or province, while the World Bank and other development agencies have divided the country on the basis of resource base, agricultural output and potential for development for examining agricultural production. A regional approach similar to that employed by the World Bank recognizing real differences in production potential is most appropriate. Due to the manner in which data are collected and reported within YAR, these regions should be defined coincident.

Due to the heavy dependence of agriculture on rainfall, most agricultural production and the highest yields come from the high rainfall areas of the Central Highlands. The Tihama area with the lowest rainfall is best suited to the production of millet, although cotton and horticulture products can be produced in areas with access to irrigation. Yields of cereals in the Tihama are low. The Eastern Slopes are not currently a significant factor in agricultural production. Although the rainfall in the Intermediate Plains and Western Slopes is lower than in the Central Highlands these areas are capable of producing a wide range of agricultural products when appropriate inputs and improved technology are supplied.

The major development activities in agriculture have taken place in the Central Highlands through the SURDP and in the Tihama with the TDA and FAO development activities. Agricultural research is currently concentrated in the Central Highlands at Taiz, and regional research is limited.

This section will discuss agricultural production in YAR examining the available resource bases, the institutional support for agriculture, and then evaluating the situation as it relates to each of the important agricultural

products. A summary of the current agricultural status will conclude this section.

Table III.1.  
Agricultural Regions in YAR Used in this Analysis

Region	Governorates Included
Tihama	Hodeidah
Western Slopes	Hajjah
Central Highlands	Ibb, Taiz
Intermediate Plains	Beida, Dhamar, Sana'a, Saadah, Mahweet
Eastern Slopes	Marib

### III.2. Agricultural Inputs

The major agricultural inputs discussed are labor, water and land, production inputs, and credit.

#### Population and Labor

Accurate data on population in YAR do not exist. Figures for the 1981 census are currently being revised downward and it is likely that the current figure lies somewhere between the extrapolation of the 1975 census and the 1981 count. Analysis of crude birth and death rates indicates that a population growth rate in the range of 2.25 to 2.5 is probably appropriate, and that approximately 25 percent of the population have migrated either internally within YAR or to foreign countries. This migration is a significant factor in agricultural development since it has reduced the supply of available labor, and remittances from this out-migrant population have supported growth in domestic consumption, further distorting the trade picture.

The YAR population is basically agrarian, with 78.7 percent of the households deriving their income from agriculture. This figure has been declining steadily over the past five years, and particularly in the poorer producing regions like the Tihama, the percentage of agrarian households

Table III.2.  
Population Patterns in Agricultural Regions in YAR, 1981

Region	Total	Males	Females	Agricultural Households (%)	In Country Migration (%)
Tihama	1,087,508	593,642	493,866	65.0	4.4
Western Slopes	890,954	480,525	410,429	71.5	4.2
Central Highlands	2,882,381	1,614,091	1,268,290	82.8	6.0
Intermediate Plains	3,502,844	1,955,129	1,547,715	87.0	5.3
Eastern Slopes	<u>193,287</u>	<u>110,503</u>	<u>82,784</u>	<u>n.a.</u>	<u>n.a.</u>
Total	8,556,974	4,753,890	3,803,084	78.7	5.4

Source: Adapted from CPO, 1981; and Statistical Project, 1981

may be as low as 65 percent (see Table II.2.). Agricultural labor has become increasingly expensive due to outmigration and competition from the construction sector. Although there is considerable debate over the existence of an agricultural labor shortage, prevailing labor costs clearly indicate a lack of adequate supplies of relatively inexpensive labor. Seasonal shortages at harvest and plenty times have been reported. Current agricultural wages range from 60-80 YR per day.

A population and housing census was conducted in 1975 and the Confederation of Yemen Development Associations (CYDA) conducted a population census in 1981. Results of these two enumerations are shown in Table III.3. Using the two census figures and FAO estimated growth rates, population estimates for the past five year period can be developed as shown in Table III.4. Actual population figures are probably somewhere between these two values. Population figures for males and females have shifted markedly between the two enumerations. Examination of the age and sex distribution of the population shown in Table III.5. indicate there may be serious inaccuracies in the counting of women of childbearing age, due to cultural practices. This requires larger numbers to be estimated and reduces the accuracy of the figures.

Table III.3.  
Population Estimates in YAR from Census Figures, 1975-1981

Category	1975	1981
Recorded population in country	4,540,230	6,226,921
Estimated population of uncovered areas	294,500	---
Un-enumerated population		-
for technical reasons	260,000	387,191
for social reasons	163,800	318,471
Out-migrant in country	---	229,268
Migrants outside country	<u>1,234,000</u>	<u>1,395,123</u>
TOTAL	6,492,530	8,556,974

Source: CPO, 1981

Table III.4.  
Resident Population Estimates and Changes in YAR, 1975-1980

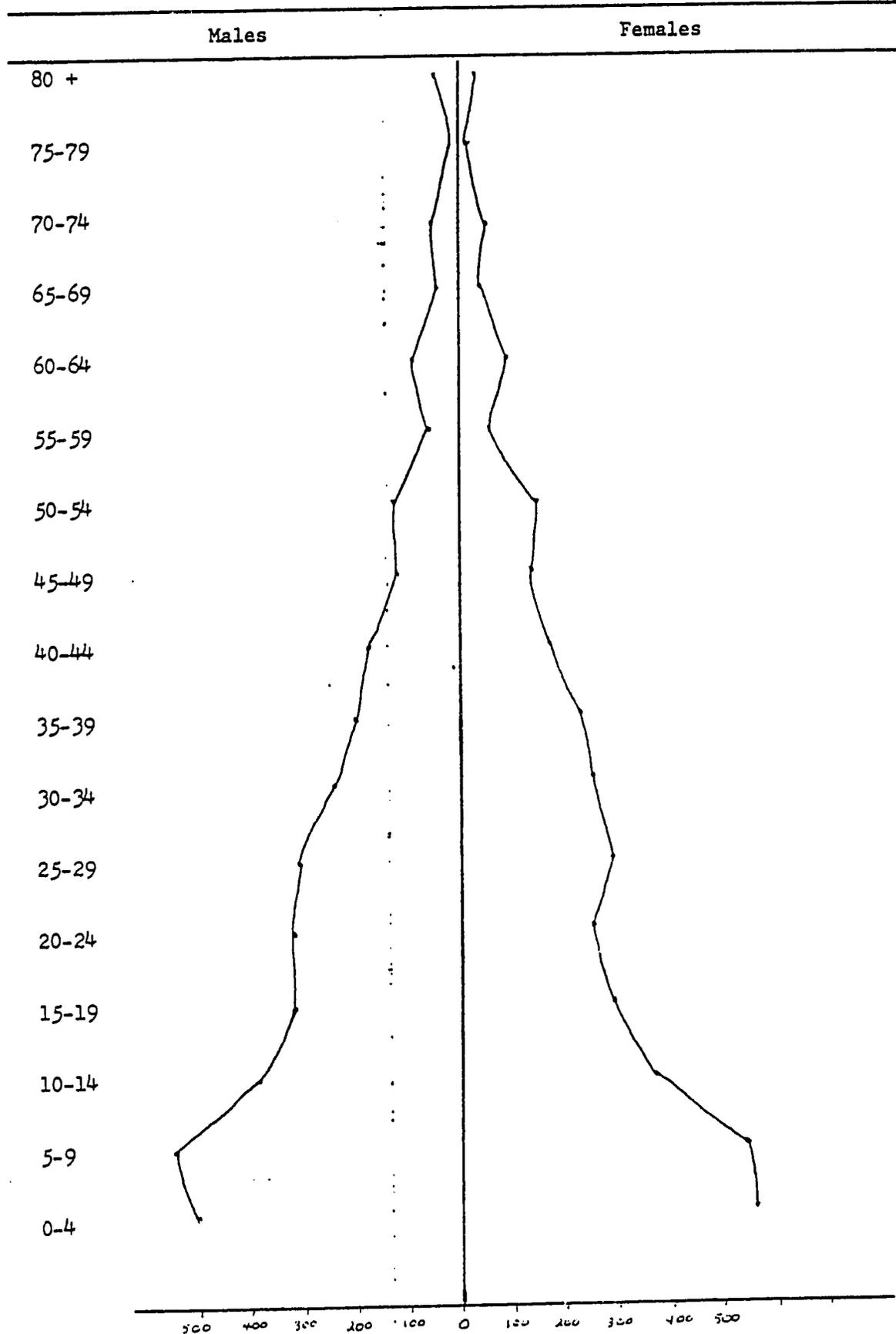
Year	FAO Population <sup>a</sup>	Change	Population CYDA Census <sup>b</sup>
1975	5,282,000	--	6,385,927
1976	5,395,000	+2.1	6,520,032
1977	5,518,000	+2.3	6,669,993
1978	5,648,000	+2.4	6,830,073
1979	5,785,000	+2.4	6,993,995
1980	5,926,000	+2.4	7,161,851

a. Based on 1975 CPO census

b. Based on 1981 CYDA census

Source: FAO, 1981; CPO, 1981.

Table III.5.  
Age Distribution of Population in YAR, 1981



Source: Adapted from CPO, 1981.

### Farm Labor Availability

It is generally stated that a serious shortage of farm labor exists in YAR resulting in land being abandoned and maintenance of terraced land being postponed, as can be seen in Table III.6. In lower production areas, where mechanization is not used and hired labor is more common, more land is going out of production. The 1975 census indicates an agriculture labor force of 830,340 (CPO, 1981, Table 18/2). Based on estimates of labor use (World Bank, 1979) and official statistics, farm labor requirements are increasing at a rate of approximately one percent per year. Although previous work (World Bank, 1979) showed labor in agriculture fully utilized, current revised data question that assumption (see Table III.7). This change is due to a significant reduction in hectareage under cultivation and a questionable reduction in the number of sheep and goats kept on farms.

If a typical farm worker is considered fully utilized at 140 mandays per year, labor requirements in 1976-77 were 524,814 and in 1979-80 were 540,921, far below the reported work force figures. If sheep and goat figures are increased to 8.4 million as suggested by the veterinary service, manpower requirements become 631,371. This would allow for a doubling of vegetable production or a trebling of grape production before an absolute labor shortage would occur. The figure of 140 mandays of labor per year would seem to be below the maximum possible. It seems more likely that a reluctance to work in agriculture given prevailing returns to labor rather than an absolute labor shortage is the cause of high farm labor rates. It is possible that seasonal shortages may occur, during harvest for example, but there is no evidence to support this.

Table III.6.  
Land Use and Manpower Sources by Agricultural Region in YAR, 1981

Region	Percent of land in crops	Percent of land fallow or abandoned	Percent of land in other uses <sup>a</sup>	Percent of holdings using only family labor	Percent of holdings using mechanized cultivation
Tihama	69.2	29.8	1.0	36.4	9.8
Western Slopes	76.8	21.9	1.3	44.8	3.0
Central Highlands	90.5	6.9	2.6	58.9	41.5
Intermediate Plains	83.2	16.1	0.7	63.3	19.2
Eastern Slopes	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>
Total	78.3	20.2	1.5	54.9	28.4

Source: adapted from Statistical Project, 1981, Tables 10, 12 and 14.

a. See Table III.15. for explanation of other uses.

- Table III.7.  
Changes in Estimated Agricultural Sector Labor Utilization in YAR  
1976-77 - 1979-80

	Area (000 Ha) <sup>a</sup>		Man-Days /Ha <sup>b</sup>	Man-Days (000's)		% Change
	1976-77	1979-80		1976-77	1979-80	
<u>Cereals</u>						
Sorghum & millet	786.0	790.6	45	35,370	35,577	+0.6
Maize	61.0	63.7	35	2,135	2,229	+4.4
Wheat	55.0	51.5	41	2,255	2,111	-6.4
Barley	60.0	58.1	41	2,460	2,382	-3.2
Sub-total				42,220	42,299	+0.2
<u>Legumes, Vegetables</u>						
Legumes	72.0	71.5	35	2,520	2,502	-0.7
Green vegetables	22.2	26.4	150	3,330	3,960	+18.9
Potatoes	8.6	10.6	100	860	1,060	+23.3
Sub-total				6,710	7,522	+12.1
<u>Fruits, Tree Crops</u>						
Fruits	13.4	14.2	100	1,340	1,420	+6.0
Grapes	10.0	11.5	150	1,500	1,725	+15.0
Dates (000 trees)	1250	1250	0.2	250	250	n.c.
Coffee	7.5	7.7	75	562	577	+2.7
Sub-total				3,652	3,972	+8.8
<u>Industrial Crops</u>						
Cotton	6.3	3.0	75	472	225	-52.4
Tobacco	5.3	6.1	100	530	610	+15.1
Sesame	10.2	10.1	35	357	353	-9.8
Sub-total				1,359	1,188	-12.6
<u>Livestock (000's)</u>						
			000 Man-Days /000 Hd			
Chickens <sup>c</sup>	3,100	3,500	.45	1,395	1,575	+12.9
Cattle	820	872	10.5	8,610	9,156	+6.0
Sheep and goats	3,529	3,710	2.7	9,528	10,017	+5.1
Sub-total				19,533	20,748	+6.2
<u>Total Labor Requirement</u>				73,474	75,729	+3.1

- a. Source: MOA, 1981 Tables 3/3, 4/3, 5/3, 6/3, 7/3  
b. Source: World Bank, April, 1979  
c. CID estimates

### Education and Training

YAR is placing heavy emphasis on education as a means of upgrading the labor force. This is evidenced by school construction and development of educational programs. Figures for educational participation as shown in Table III.8. Although significant numbers of children are currently in educational programs, literacy remains low and participation by women is extremely poor. Agriculture is particularly short of technically trained personnel for use in development programs. Table III.9. outlines MOA goals for technical training.

Table III.8.  
Educational Facilities and Usage in YAR, 1979-80

Level	Total	Number of Students				No. of Schools	No. of Class-rooms	Age Group (%)
		Males	(%)	Females	(%)			
Primary	335,249	293,542	(87.6)	41,707	(12.4)	2,543	9,650	35.8
Preparatory	20,764	17,969	(86.5)	2,795	(13.5)	197	655	5.2
Secondary	8,229	7,183	(87.3)	1,046	(12.7)	55	249	3.0
Sana'a University	4,220	3,771	(89.4)	449	(10.6)	n.a.	n.a.	1.0
Comm'l Secondary	394	313	(79.4)	81	(20.6)	7	19	--
Technical Secondary	356	355	(99.7)	1	(0.3)	2	16	--
Literacy Classes	10,406	n.a.		n.a.		97	423	--

Source: CPO, 1981, Tables 1/9, 2/9, 3/9, 6/9; Manpower Survey, 1981.

Table III.9.  
MOA Training Plan for YAR, 1978-1979

Type of Training	Planned No. of Trainees	Actual No. of Trainees	Actual Planned
Higher Education	15	8	53
Short-Term Abroad	38	17	52
Extension Agents	90	66	73
Mechanics	12	11	92
Assistant Veterinarians	16	18	113
Fishermen	10	15	150
Irrigation	40	40	100
Total	216	175	81

Source: Manpower Survey, 1981.

The government, since 1970, has been involved in a development strategy for the education sector based upon:

- . Provision of a primary education for all children, and nonformal education, particularly literacy training, for the unschooled;
- . Improving the supply of qualified Yemeni teachers and teaching materials in the schools and developing an adequate pool of trained and educated manpower through diversification of secondary education to serve the needs of all sectors, especially agriculture;
- . Planning for the construction of needed school buildings with the formation of a school building unit;
- . Raising the educational and administrative efficiency of the MOE and the University.

As a result of these policies, primary school enrollment has shown an average annual growth of 14 percent; preparatory schools, 17 percent; and secondary schools, 25 percent. University enrollment has been growing at 24 percent per year. In spite of this growth in enrollment, those attending school represent only 35.8% of the corresponding age group for primary schools, 5.2 percent for lower secondary schools, 3 percent for upper secondary schools, and 1 percent for University enrollment. Equally striking is the fact that female enrollment represents only 12.5 percent of total enrollment at the primary level, 15.3 percent at the lower secondary level, 13.1 percent at the upper secondary level, but improves to 17.7 percent at the University level (see Table III.8.)

Dropout rates are also extremely high according to the Ministry of Education. Only 13 percent of the boys and 16 percent of the girls entering Grade 1 in 1971 were enrolled in Grade 9 in 1979. Only about half the students completing each cycle proceed to the next level of schooling. The quality of schooling is also relatively low, as indicated by the low pass rate on examinations, averaging only 65 percent at the general secondary level in

1978-79. This situation limits the number of qualified candidates for training and advanced educational programs for all the Ministries, including the Ministry of Agriculture. While a first-year enrollment in the Ibb Agricultural Secondary Institute program in 1980 was anticipated to be about 60 students, the actual enrollment was 54. In subsequent years this has dropped to 28 and 17 currently enrolled for the new class in 1981. It had been anticipated that 120 students would graduate annually from this and an additional school in Surdud by 1985. The problem has been insufficient incentive for qualified students to participate in these training programs.

The Ministry of Agriculture has had one of the largest out-of-country training programs for the staff of the Central Ministry and regional projects. About 80 students per year have been sent out-of-country annually for training. Since 1977, 382 students have been sent abroad for Bachelor of Science courses in agriculture and 44 in veterinary sciences. If the return of these students with the degree level training indicated had been realized, the Ministry of Agriculture would have reached its targeted levels. Instead, the employment situation of graduates in the Ministry of Agriculture in 1979 remained inadequate with only 22 of the 106 Yemeni personnel in all Directorates holding a B.S. degree or more. Further, of the thirty graduates who were expected to join the MOA staff following completion of their training in July of 1979, only ten returned to YAR and only three of these were recruited by the Ministry.

Additionally, inability to recruit a single Yemeni candidate holding a Civil or Agricultural Engineering degree cancelled the post-graduate training of short-term and Master of Science courses for the Irrigation Department of MOA. Other students sent abroad for a three-year technician training program returned after three months, as they could not handle the curriculum. The Southern Rural Upland Development Project has 765 man-months of external

training built into its program. However, discussions with its Director indicated that most of these training opportunities are "going by the board" because of the lack of qualified candidates or the unwillingness of the project to release candidates because of the impact upon the project's performance. The lack of adequate foreign language proficiency is also a negative factor.

The use of counterparts to experts has been viewed as a rapid method of training. However, the 1978 report by a UNESCO task force on the institutional support project to the Ministry of Agriculture cites the Ministry of Agriculture for not being able to provide a sufficient number of counterparts to be trained with the expatriate staff of their 25 projects. This has been the experience on CID projects to the present time.

#### Land and Water

Of the 20 million hectares of land in YAR, only 1.5 million hectares are regularly cultivated, with an additional 2.0 million hectares of marginal land which may be cultivated in years of exceptional rainfall. The major portion of cultivatable land lies in the central highlands and intermediate plains regions (see Table III.10). Much of the land currently not under cultivation is used as rangeland for livestock. It has been estimated that as much as 80 percent of the land in YAR is so used.

Of the cultivatable land, 83 percent is irrigated by rainfall, 8 percent is spate irrigated, 5 percent has perennial water, and 4 percent is irrigated using wells (see Table III.11.).

This dependence on rainfall is perhaps the most serious barrier to agricultural development. In the Sana'a region, 1979 and 1980 were the worst rainfall years in history (see Table III.12.). As a result, there has been a noticeable increase in the amount of fallow land in that area. Casual view of the Sana'a region may lead to the impression that a general land abandon-

ment is occurring in YAR. This is not the case. Due to the high dependence on rain for production, lack of water, rather than water management, appears to be the most serious problem. There is an obvious need for systematic, accurate meteorological data in all regions of YAR to help farmers in the various areas plan better and to help agricultural researchers interpret their findings accurately.

According to Dewar et.al. (1978), rainfall in YAR is generally low (100-400 mm), except in the central highlands and intermediate plains regions, where rainfall varies between 500 and 1,000 mm. Rain is generally received during the monsoon period from April to September (Table III.13). Two rainy seasons are recognized; the first extending from April to June, and the second from July through September (World Bank, 1979). As the data in Table III.12. indicates, however, there is considerable variation from year to year.

A study of irrigation water quality was conducted in 1975. In general, water was found suitable for irrigation, but areas south of Al-Kaida and in the Tihama region may be unsuitable for citrus and tobacco production, due to chlorides in the water. Unfortunately, there has been no systematic study of hydrology in YAR to permit monitoring of changes in water resources nor to identify water potential for development.

The MOA has undertaken several water-related projects during the first five year plan, with only limited success. Although 22 meteorological stations have been established, data are not being generated due to lack of qualified personnel to read the stations.

Although a Chinese team identified 130 possible small dam sites suitable for flood water control and use, only 11 have been built. Maintenance is not done on water projects due to lack of trained individuals. A major irrigation project is planned for Marib.

In general, water projects lack both funding and qualified personnel.

Table III.10.  
Approximate Land Areas of Agricultural Regions in YAR, 1981  
(000's Ha)

Region	Total Area	Cultivable Area	Marginal	Forest and Shrub
Tihama	3,500	235	500	450
Western Slopes	1,700	130	250	50
Central Highlands	2,500	550	150	900
Intermediate Plains	4,300	600	1,100	200
Eastern Slopes	8,000	--	--	--
Total	20,000	1,515	2,000	1,600

Source: Adapted from CPO, 1981, p. 78.

Table III.11.  
Cultivated Area by Irrigation Source in YAR, 1981  
(000's Ha)

Region	Rainfall	Spate	Perennial	Wells
Tihama	96.4	100	5	33.6
Western Slopes	113.9	10	5	1.1
Central Highlands	497.2	10	38	4.8
Intermediate Plains	558.3	--	25	16.7
Eastern Slopes	--	--	--	--
Total	1,265.8	120	73	56.2

Source: Adapted from CPO, 1981, p. 79.

Table III.12.  
Rainfall Variability at Selected Stations (mm)

Station	Historical			1978	1979	1980
	Mean	Min	Max			
Taiz	580.4	166.7	831.4	166.7	400.4	300.0
Ibb	1,580.1	1,050.1	2,554.9	n.a.	n.a.	n.a.
Sana'a	200.7	95.9	350.6	166.5	95.9	98.6

Sources: World Bank, 1979, table 41; CPO, 1981, pp. 23-24.

Table III.13.  
Average Annual Rainfall Distribution by Agricultural Region (mm)

Region	First Rainy Season						Second Rainy Season					
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
Intermediate Plains	1.7	15.2	48.1	62.0	73.2	39.5	66.2	141.9	34.4	18.9	13.2	9.0
Central Highlands	11.2	15.0	51.6	140.9	195.4	242.7	264.8	325.0	223.1	112.6	45.8	21.4
Tihama	5.9	1.6	6.2	20.9	29.3	6.1	35.3	76.6	109.9	49.9	3.5	3.8

Source: Adapted from World Bank, 1979, Tables 42-44.

The legal right of a land holder to operate his land in YAR may take the several forms outlined in Table III.14. Land use under these tenure systems may take many forms. The Agricultural census defines the seven types of land use shown in Table III.15.

In areas where tenant farmers are most common, tenants and landowners commonly share on a 50/50 basis but the relative shares will range between 25 and 75 percent, depending on the amount of inputs provided by the landowner. Tenants typically receive 65 percent of tobacco production and 30 percent of coffee. These relationships do not encourage sharecroppers to adopt new technologies, since they typically reduce his share.

Most land holdings are small and fragmented, but most of the land area is found in large land holdings (see Table III.16.) According to the agricultural census, most holdings included both crops and animals. In the Tihama region, large land holdings are much more common. In the western slopes region there is a much higher percentage (24.3 percent) of vegetable only holdings, while in the intermediate plains there are large holdings without animals, particularly in the Mahweet governorate.

As previously shown in Table III.8, most land is under crops, but the percentage of fallow and abandoned land is much higher in the Tihama and Western Slopes regions. These areas depend much more heavily on hired labor than the Central Highlands and Intermediate Plains.

Table III.14.  
Forms of Land Tenure in YAR

- 
1. Titled ownership
  2. Ownership without title
    - a. perpetual lease
    - b. tribal grant
    - c. communal land
  3. Rental
    - a. cash rent
    - b. shared yield (tenant farming)
      - (1) with shared technical responsibility
      - (2) without shared technical responsibility
- 

Source: Statistical Project, 1981.

Table III.15.  
Alternative Forms of Land Use in YAR

- 
1. Land under field crops - used for crops with land planted each year, including cereals and alfalfa.
  2. Land temporarily fallow - land not cultivated for a period of less than 5 years.
  3. Land under permanent crops - land used for crops planted for more than one year, including coffee and fruit trees.
  4. Permanent meadow and pasture - land used for forage crops for more than 5 years, either naturally growing or seeded.
  5. Forest land - land with trees having value as wood or timber.
  6. Abandoned land - land not cultivated due to lack of funds or labor.
  7. Other land not classified above.
- 

Source: Statistical Project, 1981.

Table III.16.  
Land Holding Size and Fragmentation in YAR, 1981

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Region	Percent of holdings less than 1 Ha	Percent of land area in holdings less than 1 Ha	Percent of holdings in more than 1 parcel
Tihama	13.7	0.9	65.6
Western Slopes	55.8	8.5	80.0
Central Highlands	80.0	34.1	80.0
Intermediate Plains	70.2	24.1	90.6
Eastern Slopes	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>
Total	65.8	14.6	80.0

---

Source: Adapted from Statistical Project, 1981. Table 4,5,7.

### Production Inputs

Improved technology packages are provided through the SURDP and the TDA projects and inputs are provided through the ACB on credit. Outside the development project, farmers generally depend on the commercial sector to provide necessary farm inputs. Table III.17. indicates that farmers in the high production regions are willing to make use of improved inputs. In the Tihama, use of manure and fertilizer is extremely limited. There is no evidence of the effect of the use of these inputs on production.

Even though farmers in the YAR may make use of fertilizers and manure, in the absence of information these products may not be used effectively. Most farmers depend on merchants for guidance and may use the wrong material, too much or too little. Relatively high use levels indicate farmers are willing to try improved technologies, and if knowledge and training can be provided, improved yields could be produced. Extension personnel in the Tihama complain that research is not applicable to their area. There is no regional research being conducted outside the Southern Uplands.

Table III.17.  
Use of Manure, Fertilizer and Pesticides  
in Various Agricultural Regions of YAR, 1981

Region	Holdings using: (percent)			Land area receiving: (percent)		
	Manure	Fertilizer	Pesticides	Manure	Fertilizer	Pesticides
Tihama	20.0	4.0	8.4	0.1	0.1	3.5
Western Slopes	55.5	23.5	8.0	15.3	5.5	0.6
Central Highlands	95.8	67.8	5.6	86.3	46.5	3.7
Intermediate Plains	81.0	25.5	1.0	49.9	17.9	0.8
Eastern Slopes	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>	<u>n.a.</u>
Total	74.9	45.0	5.4	33.5	16.5	2.8

Source: Adapted from Statistical Project, 1981, Table 13.

### Credit and Capital Investment

The Agricultural Credit Bank was established in 1976 to provide loans for the development of agriculture, irrigation, forestry and animal production in YAR. The ACB is charged with encouraging and promoting agricultural cooperation and the development of agriculturally based industries.

The bank maintains offices in the following cities:

Sana'a	Dhamar	Ibb
Taiz	Hodeidah	Zabid
Al-Zahra	Abs	Beit Al-Fakeil

Through the bank, farmers receive technical assistance and advice, and the ACB may serve as a marketing agent for both inputs and products. Initially capitalized for 100 million rials, this amount was doubled in 1981. The bank charges interest at a subsidized rate of 8-9% and requires adequate security for loans. A loan repayment rate of 91% has been maintained since 1976.

The nature of loan disbursements by ACB is described in Table III.18. Credit and investment in agriculture are discussed in additional detail in Chapter II.

Table III.18.  
Loan Disbursements by the Agricultural Credit Bank  
in YAR - 1976-1980

Purpose	Amount (YR millions)	Percentage of Loans
Agricultural machinery	29.0	21.7
Water development	33.7	25.2
Poultry development	7.8	5.8
Poultry production (seasonal)	8.8	6.6
Tree planting	3.7	2.8
Livestock development	8.2	6.1
Cotton production (seasonal)	8.8	6.6
General production (inputs)	15.5	11.6
Fisheries development	1.5	1.1
Transportation	0.3	0.2
On-farm development	16.5	12.3
	<u>133.8</u>	<u>100 %</u>

Source: Agricultural Credit Bank, 1980.

### III.3. Supporting Institutions

#### Extension Training

The extension service demands particular attention in the country of Yemen. Although it exists in theory as the National Extension Service, over 80% of the agents reside and work in two areas of the country. The remainder of the agents are scattered in different regions with no specialist backup or local government extension organizations. Only those attached to the Tihama Development Authority and the Southern Uplands Rural Development Project have a semblance of a "State Extension Service".

The Ministry of Agriculture currently oversees two centers for training agricultural extension agents and one for training livestock assistants. The extension agent training centers at Taiz and Zabid conduct an eleven-month training course with the majority of their students having completed only six grades of primary schooling. Those completing the courses are expected to work for the Ministry of Agriculture for five years. The training is designed for extension activities to increase the productivity of the subsistence farmers in the production of marketable surpluses. The Taiz center has a capacity of thirty, while the Zabid center can handle twenty. Between 1976 and 1980, 285 agents were trained at the centers. Only 40 percent of the agents trained in the last five years are still in service.

Few students with nine grades of formal schooling have been enrolled, because the schools are viewed as terminal institutions, closing the door to further secondary schooling. This is unfortunate, since the current requirements for farm mechanization, on-farm water management, range improvement, terraced land management, erosion control and dryland farming techniques require a better background education. It is possible that extension agents, trained to a higher level, may be forthcoming through through the Ministry of Education's Agricultural Secondary Institutes at Ibb and Surdud.

Wenner found that "The extension programs and agents which have been used thus far have not been terribly successful: the agents are not old enough, lack sufficient prestige, and most important, are not 'locals'." The CID Baseline Study indicates that "with few exceptions, extension workers at the community level are assigned to their work areas by the management of the Central Agricultural Research and Training Center in Taiz in cooperation with the leadership of the respective development project organizations such as Tihama Development Authority, the Southern Uplands Rural Development Project and the many private donor development projects in operation such as the German Plant Protection Project." This is apparently still the situation.

The Livestock Assistants' training program is twelve months long with entry qualifications of six or more years of primary schooling. Eighteen of the 24 admitted annually completed the training satisfactorily. A Fisheries Demonstration/Training Center was established in 1974 in Hodeidah for training fishermen, with a center for demonstrating boat mechanization, boat building, gear technology and engine repair maintenance. This project was abandoned in 1976.

Even though agriculture provides two-thirds of the employment for the total Yemeni economy, there is no Faculty for Agriculture currently in Sana'a University. As a result, technical specialists for training extension agents or conducting agricultural research are not being developed internally.

#### The Southern Uplands Rural Development Project

This particular project has achieved success in its extension program. In the last five years, it has established 24 of 28 planned extension centers, 1 of 2 veterinary centers and 5 of 6 extension offices. The program had contacted 55,000 farmers operating 135,000 hectares of land.

In 1978, home economists were added to the staff to work in the program areas of illiteracy control, sewing, public health, and nutrition. Their

performance over the last three years has included:

1978	26 classes	500 students
1979	24 classes	592 students
1980	16 classes	870 students

A quarterly report for the period January-March, 1981 by the Southern Rural Uplands Development Project indicated that, effective the first of July, they had signed ten experts but had twelve vacant expert posts. Seventeen extension supervisors were in place together with 67 extensionists, 18 home economics extensionists, one audio-visual supervisor, two plant protection supervisors, three horticultural/forestry technicians, three counterparts, a supervisor for 21 veterinary assistants, and four skilled support staff. In addition, the project had a well-staffed engineering division consisting of 24 specialists and 15 laborers. Nine people were also employed in the workshop for mechanical repairs. An administrative staff of 65 including 30 drivers also was associated with the project. All of the experts employed were expatriates.

Eight areas of training had been conducted for farmers, with 2,525 farmers in attendance. A seventeen-day refresher course for all of the extension agents was also conducted. Special emphasis was placed on the practical aspect during this training session. Five extension agents also attended a twelve-week course in field operation, repair and maintenance of tractors conducted by the Yemeni-British Mechanization Project at Taiz. Field days attracted 204 farmers; 662 pilot farmers contacted an additional total of 7,295 farmers. Three hundred and eight women participated in the eleven classes conducted in the home economics program.

Discussions with the manager of the Southern Uplands Rural Development Project indicated that they had great difficulty recruiting candidates to take advanced training both in-country and out-of-country. They further indicated that they were so short of competent staff that they

were quite reluctant to allow individuals presently in the program to accept these opportunities, because it would have such a detrimental impact on the existing program.

#### The Tihama Development Authority

The progress report for the Tihama Development Authority for the first half of 1980 indicated several extension activities. Thirteen field extension centers provided the pivot point for all extension activities, particularly in assisting Tihama farmers. These centers were all administered, and the field extensionists had supervisors and were said to be backstopped by subject matter specialists. Of four area supervisors' centers, two were supervised by UN extensionists and two by National Extension supervisors. These supervisory centers assisted the field extensionists with their activities, i.e. the training of farmers and extensionists and the evaluation of the program. Twenty short-term in-the-field mini sessions were conducted with farmers during this period. Also, twelve short-term training sessions for field extensionists were conducted. These were conducted by supervisors together with subject matter specialists.

A refresher training course for field extensionists, area supervisors and technicians was also conducted. A total of 36 papers were read by subject matter specialists from all over the country. People from the major research centers, special projects and related rural development programs presented the papers. Thirty-one extensionists, ten technicians from the Zabid project and four area supervisors attended. This refresher course was designed to upgrade knowledge and skill levels of extensionists, technicians and area supervisors by providing them with the latest research findings.

Other activities included the use of 108 demonstration plots, the recruitment, training and functioning of lead cooperative farmers, farmer meetings and discussions, and Farmer Days. Special subject matter activities

included cotton production and seed multiplication, cooperatives, field crop production, vegetable production, date palm marketing, farm mechanization, and the recruitment of specialists and consultants.

It was indicated that the delay in recruitment of specialists and the supervisors made it difficult to implement the extension programs to the fullest. Graduate counterparts to assist in all technical and supervisory sections were also in extremely short supply. Since these counterparts will eventually form the core of the extension service program for the Tihama Development Authority, it was felt that the recruitment was vital. The main problem in recruitment was that all of the national/graduate staff are poorly paid and their living conditions including housing, electrical service, etc., are deplorable.

It is also indicated that there was a lack of applicable recommendations from research output. This shortage of information applicable to the Tihama was critical. Farm inputs and poor marketing channels affected the timely, economical utilization of the agronomic and new crops introduced. The Authority has recommended that a separate, fully staffed and equipped research component for the Tihama should be immediately established. This would provide the receptive Tihama farmer with innovations, new ideas, access to systematic research relative to the use of machinery, farm inputs such as fertilizers, pesticides and seeds. If the established extension service is allowed to grow, particularly with the deployment of additional national counterparts and field extensionists, and continues to receive the support of the Government and private sector as it has thus far, linkage between research and the farmer shall have been established.

It is instructive to note that during the period reported, the planned man-months of experts' time was 27 while the actual was 26. However, over the accumulative length of the project, 148 man-months of expertise had been planned while only 54 had actually been implemented. Similarly, counterpart

staff had been planned for 72 man-months during the reporting period but only 24 were actually implemented. A cumulative 216 man-months of counterpart staff had been planned but only 72 actually implemented. Sixty field extensionists were on hand at the time of the report, together with five specialists, six supervisors (three vacancies) with seven counterparts (ten vacancies) and four support staff.

It is imperative that the MOA and MOE (Ibb and Surdud) establish an improved system for recruiting, training and retaining students and staff. A defined career structure together with proper financial and fringe benefit incentives is essential.

#### Public Administration

The main issues that characterize the public administration in YAR ministries and must be dealt with have been identified by a World Bank team as follows:

- . Lack of functional job classifications
- . Shortage of qualified civil servants
- . Utilization of foreign experts
- . Streamlining the administration
- . Administrative procedures
- . Ambiguous relations between central and local authorities

Those public employees classified as higher management increased from a total of 2.3 percent to 3 percent of the total employment from 1977 to 1980. Middle management increased from 15.7 percent of the total to 19 percent by 1980. The percentage of support staff actually declined during this period. Overall, the public sector employment increased by 17 percent during this period.

The shortage of technically qualified personnel is a major and central difficulty for the public administration. This shortage is compounded by

the apparent mismatch between the education/training attainment of civil servants and the requirements of the jobs. Approximately 80 percent of the government employees did not have the necessary education/training for the occupations they held in 1975. An indicator of the lack of trained personnel is the fact that 20 percent of the total number of approved positions were vacant in 1977. In the technical department, as many as half of the approved positions were vacant. As a result, there are a great many expatriates in the public sector employment.

In addition to the general lack of people, comparison of salaries/benefits between the private and public sectors leads to a generally held belief that private sector jobs tend to be better paid. However, it should be pointed out that if the public sector loses some talent to the private sector, it is still serving the country and does not necessarily represent a net loss to the economy as a whole. Only when the loss is out of the country does the economy in general suffer.

The need for focused and rapid training for civil service has been personally recognized for some time through the establishment of the National Institute of Public Administration. However, enrollment in the institute's courses at Sana'a has been disappointing with less than 50 percent of the institute's capacity being utilized. Dropouts and examination failures are estimated to account for about one-third of those registered. Thus, the effective throughput is only about 30 percent of the institute's capacity.

It is also well to note that less than 4 percent of those employed by the central administration agencies in 1975 were females. This untapped resource puts the Yemen Arab Republic at a tremendous disadvantage.

The basic salary structure established by the most recent change in the civil service laws was as follows:

Deputy Minister - grade one, YR 1,650 to YR 2,150  
grade two, YR 1,450 to YR 1,930

Director General - a - YR 1,300 to YR 1,660

b - YR 1,200 to YR 1,550

Other Civil Service categories range from YR 1,100 to YR 1,450 down to a low of YR 420 to YR 620. It should be pointed out, however, that there are five types of additional allowances to the basic salary of a civil servant:

- . Nature of work
- . Specialization
- . Graduation
- . Rural location
- . Representation

The nature of work allowance is 50 percent for the top eleven grades, 60 percent for grade 12 and 75 percent for grade 13. The specialization allowances range from 10 percent of the basic salary for holders of bachelor's degrees to 25 percent for holders of doctoral degrees. Civil servants can also receive a hardship allowance, ranging from 20 percent of the base salary for residents of Sana'a, Dhamar, Ibb and Taiz to 40 percent for residents of Saadah. The other four governorates receive 30 percent. Representation allowance is limited to the top five grades and ranges from YR 100 per month to YR 400 per month for a Deputy Minister. Some civil servants also receive fees for serving on any number of committees and boards. Thus, a highly qualified active civil servant can easily double his basic salary through allowances.

Still, these levels of salaries do not compare favorably with those recorded in the private sector. For example, professional and highly skilled workers are reported to receive YR 7,000 per month; technicians, YR 5,500 per month; skilled carpenters, YR 100 to YR 200 per day; skilled Yemeni bulldozer operators, YR 2,500 per month and non-Yemenis YR 3,375 per month. Unskilled Yemeni laborers receive around YR 80 per day while unskilled non-Yemeni loaders at

the port receive YR 3,500 per month. This situation makes it easy to understand the difficulty encountered in recruiting fulltime civil servants. It becomes even more crucial when recruiting counterparts and persons to fill the trainee positions offered by the various Ministries.

#### III.4. Agricultural Production

Agricultural production in YAR has been dominated by subsistence farming with cereals, primarily sorghum and millet, as the major crops. With increasing population, incomes and labor costs, agricultural production has lagged demand, increasing the dependence on imports to meet food needs. Due to low agricultural productivity and high operating costs in YAR agriculture, it appears that imported crops are more economical than domestically produced products.

As shown in Table III.19, returns to farmers for cereal and traditional cash crops are generally lower than returns for horticulture products or gat on either a land use or a labor use basis. As a result, farmers have maintained only subsistence levels of production of cereals, while shifting production into crops with higher yields. Production of cash crops has declined. This section examines the situation for the major sectors of agricultural production in YAR: cereals, horticulture, livestock and fishery operations.

Table III.19.  
Estimated Production Costs and Returns for Selected Crops in YAR, 1981

Crop	Labor required (Mdy/Ha)	Intensive activity labor as % of total costs	Total cost (YR/Ha)	Yield (Kg)	Farmgate price (YR/Kg)	Gross revenues (YR/Ha)	Net income (YR/HA)	Return to labor (YR/Mdy)
Sorghum	45	92.9	3,175	1,200	1.9	3,480 <sup>a</sup>	2,280	50.7
Maize	40	95.2	4,266	1,800	1.8	5,040 <sup>b</sup>	3,240	81.0
Wheat	50	93.1	3,091	1,220	2.0	3,640 <sup>c</sup>	2,420	48.4
Potatoes	100	53.3	10,511	15,300	1.4	21,420	6,120	61.2
Tomatoes	190	88.1	12,062	12,750	2.5	31,875	19,125	100.7
Grapes	150	100.0	8,404	4,800	10.0	48,000	39,596	263.9
Coffee	80	83.3	10,880	700	20.0	14,000	3,120	39.0
Qat	330 <sup>d</sup>	100.0	26,350	n.a.	n.a.	79,500	52,150	161.1

a. Includes YR 1,200 for stover.

b. Includes YR 1,800 for stover.

c. Includes YR 1,200 for straw.

d. Includes 230 Mdy for planting. After 1 year, total labor is estimated at 10% of gross revenues. Return per Mdy exceeds YR 700 in the second year.

Source: Calculated from World Bank, 1979, Tables 15, 16, 39; CPO, 1981.

### Cereal Production

Sorghum and millet are the major cereal crops produced in YAR. Increased production of these crops has been a major goal of the first five year plan, and since 1976 production has increased 4.9 percent although hectareage under cultivation has remained unchanged. Significant gains in production through increased yield have occurred in the Central Highlands as shown in Table III.20. As shown in Table III.21, available foodgrain has remained constant over 1979-1980, although the percent of imported grain has declined. In part, this has occurred due to increased consumption of animal products at the expense of cereal consumption.

The percentage of total available food grains met by domestic production has increased slightly over the past three years as indicated in Table III.22. This has been accomplished through a reduction in imports and a decrease in consumption of foodgrains. Continued population increases without significant increases in cereal production will likely require increased imports in the future. Proposals to increase grain storage indicate this will occur.

As previously indicated in Table III.19, production of sorghum is the least profitable activity for YAR farmers on both a land use and labor basis. In cereals, farmers have increasingly produced wheat and maize in preference to sorghum.

Most cereal production occurs in the Central Highlands where gains in production have been significant (+14.9 percent for sorghum and 16.3 percent for maize). In the Tihama where yields are low and strictly subsistence farming is more common, yields have declined.

The situation in the Tihama is more serious. Due to limited rainfall, millet is the major crop, supplemented by small herds of livestock. In areas where there is access to improved water sources, particularly in the Wadi Zabid and Wadi Rima areas under the TDA projects, yields have improved and there have been opportunities for increased production of horticulture crops

as shown in Table III.23. The remaining area supports primarily small farmers in tenant operations with apparently low incomes. Agricultural production in the Tihama is low compared with the upland areas.

Consumer tastes appear to be changing in YAR. Wheat and wheat flour have become major imports, perhaps substituting for sorghum and sorghum flour in the production of bread. Relatively low prices for imported wheat contribute to low farmgate prices and depress sorghum and millet production, and probably depress cereal production in general.

Table III.20.  
Changes in Area and Production of Cereal Crops by Agricultural Region in YAR 1976-77 - 1979-80  
(area in 000's Ha; production in 000's tons)

Region	<u>Sorghum &amp; Millet</u>				<u>Maize</u>			
	1979-80 Area	% Change	1979-80 Production	% Change	1979-80 Area	% Change	1979-80 Production	% Change
Tihama	160.0	n.c.	93.8	-16.3	4.0	n.c.	4.5	-19.6
Western Slopes	75.0	+7.1	48.7	-13.0	0.6	-25.0	0.5	n.c.
Central Highlands	231.6	-2.3	340.2	+14.9	54.5	+4.8	88.4	+16.3
Intermediate Plains	<u>233.0</u>	<u>+0.9</u>	<u>138.7</u>	<u>-3.0</u>	<u>4.7</u>	<u>+4.4</u>	<u>5.4</u>	<u>-10.0</u>
Total	790.6	+0.6	692.1	+4.9	63.7	+4.1	99.4	+12.1

Source: MOA, 1981, Table 3/3

Table III.21.  
Estimated Available Foodgrain Supplies  
YAR 1976-77 - 1979-80  
(000's Tons)

DOMESTIC PRODUCTION	1976-77	1977-78	1978-79	1979-80
<u>Wheat</u>				
Production	51,600	44,300	52,900	52,600
Less seed <sup>a</sup>	4,400	4,488	4,408	4,120
Less losses <sup>b</sup>	<u>3,096</u>	<u>2,658</u>	<u>3,174</u>	<u>3,156</u>
Net available	44,104	37,154	45,318	45,324
<u>Barley</u>				
Production	54,000	50,100	54,300	57,200
Less seed <sup>a</sup>	4,800	4,880	4,744	4,648
Less losses <sup>b</sup>	5,400	5,010	5,430	5,720
Less feedstock <sup>c</sup>	<u>10,800</u>	<u>10,020</u>	<u>10,860</u>	<u>11,440</u>
Net available	33,000	30,190	33,266	35,392
<u>Sorghum and Millet</u>				
Production	660,000	641,200	685,800	692,100
Less seed <sup>a</sup>	19,650	21,042	19,982	19,765
Less losses <sup>b</sup>	66,000	64,120	68,580	69,210
Less feedstock <sup>c</sup>	<u>75,900</u>	<u>73,738</u>	<u>78,867</u>	<u>79,591</u>
Net available	498,450	482,300	518,371	523,534
<u>Maize</u>				
Production	88,600	89,000	94,200	99,400
Less seed <sup>a</sup>	1,830	1,056	1,911	1,911
Less losses <sup>b</sup>	8,860	8,900	9,420	9,940
Less feedstock <sup>c</sup>	<u>11,075</u>	<u>11,125</u>	<u>11,775</u>	<u>12,425</u>
Net available	<u>66,835</u>	<u>67,919</u>	<u>71,094</u>	<u>75,124</u>
<u>Total Domestic Production</u>	642,389	617,563	668,049	679,374
<u>Imports<sup>d</sup></u>				
Wheat	151,231	311,809	350,000	240,000
Flour	(46,214)	(157,187)	(65,000)	(82,000)
(Wheat equivalent 130%)	60,078	204,343	84,500	106,600
Rice	34,800	90,917	13,545	14,000
Other cereals	7,669	4,086	7,545	5,400
Cereal preparations	(3,810)	---	(2,726)	(3,000)
(Grain equivalent 90%)	<u>3,048</u>	<u>---</u>	<u>2,453</u>	<u>2,700</u>
<u>Total Imports</u>	<u>256,826</u>	<u>611,375</u>	<u>463,043</u>	<u>450,700</u>
<u>Total Available Foodgrain</u>	899,215	1,228,938	1,131,092	1,130,074

- a. seeding rate: wheat & barley 80 kg/ha; maize 30 kg/ha; sorghum & millet 25 kg/ha  
b. loss rate: 10 percent, except wheat 6 percent  
c. feedstock use rate: barley 20%, maize 12.5%, sorghum 11.5%  
d. FAO estimates for 1979-80 imports and 1978 other cereal imports

Source: CPO, 1981, Table 3/3; FAO, Food Supply Utilization Account Turn-around Document, 1981; World Bank, 1979.

Table III.22.  
Available Per Capita Foodgrain Supplies by Source in YAR

	1976-77	1977-78	1978-79	1979-80
Total available (tons) <sup>a</sup>	899,215	1,228,938	1,131,092	1,130,074
Resident population <sup>b</sup>	5,395,000	5,518,000	5,648,000	5,785,000
Per capita (kg)	166.7	222.7	200.3	195.3
Domestic production as percent of total <sup>c</sup>	71.4	50.3	59.1	60.1

a. Table III.18.

b. Table III.4.

c. Calculated from Table III.18.

Table III.23.  
Changes in Area and Production of Fruits and Vegetables by Agricultural Region in YAR 1976-77 - 1979-80  
(area in 000's Ha; production in 000's tons)

Region	Vegetables				Grapes				Fruits			
	1979-80 Area	% Change	1979-80 Production	% Change	1979-80 Area	% Change	1979-80 Production	% Change	1979-80 Area	% Change	1979-80 Production	% Change
Tihama	5.3	+32.5	52.1	+30.3	--	--	--	--	5.2	+4.0	28.0	n.c.
Western Slopes	0.3	+50.0	2.8	+75.0	1.0	n.c.	4.7	+2.1	0.5	+25.0	2.5	+38.9
Central Highlands	14.1	+11.3	143.6	+13.6	--	--	--	--	1.5	+7.1	7.4	+5.7
Intermediate Plains	<u>6.5</u>	<u>+22.6</u>	<u>53.1</u>	<u>+19.6</u>	<u>10.5</u>	<u>+16.7</u>	<u>50.3</u>	<u>+18.9</u>	<u>6.9</u>	<u>+6.2</u>	<u>37.7</u>	<u>+9.3</u>
Total	26.4	+19.1	253.7	+20.8	11.5	+15.0	55.0	+16.8	14.2	+6.0	75.1	+6.0

Source: CPO, 1981, Tables 4/3 and 5/3

### Fruit and Vegetable Production

Major gains have been made in production of fruits and vegetables in YAR, as shown in Table III.23. Both areas under cultivation and yields have increased in all areas of the country. In fact, production of tomatoes in 1980-81 appears to exceed demand. Returns to farmers are much higher for fruits and vegetables than for cereal crops. As new land is put into production, it almost always goes into fruit and vegetable production rather than the cereals.

Target production under the first five year plan has nearly been reached fruit production. Vegetable production has not reached targets but has increased significantly. In the Tihama, vegetable production probably provides increased farm income to offset declining cereal production. Shifts from cereal to vegetables in this area, and perhaps in the country as a whole, probably have resulted from improved water development allowing farmers to increase production in response to the obvious incentives.

### Livestock Production

Census figures for livestock in the YAR appear to be highly inaccurate, particularly the values for sheep and goats. Herd size in 1976 had been estimated at 10.4 million sheep and goats. Subsequent analysis resulted in official statistics being revised downward to approximately 3.4 million. The current estimated sheep and goat herds as shown in Table III.24 are 3,751,000. A more correct figure as estimated by the British Veterinary Service may be as high as 8.4 million animals. These inaccuracies may be due to several factors. Farmers in the YAR are reluctant to correctly state the number of animals for two reasons. The Zakat tax is charged in part on animal holdings and production providing an economic disincentive to disclosure. Culturally, YAR farmers want to avoid envy on the part of enumerators. If the census taker is overly impressed with the number of animals held, the

farmer feels bad luck may follow. As a consequence, he will tend to understate his holdings. There is no evidence that herd sizes have actually been reduced by any significant amounts during recent years.

Data on animal slaughters, marketings, and culling rates are based on the official figures and crude farmer surveys. As a result, they must be taken only as estimates. Values for cattle and poultry production appear to be more accurate than sheep and goat figures.

Based on official statistics, meat and milk production are far below the targets set in the five year plan (see Tables III.26 - III.29). FAO (1981) estimates, however, place meat production from cattle, sheep and goats at 61,300 tons or 140% of target. Poultry and egg production have increased significantly during the past five years.

Byproducts of animal operations are not effectively utilized. It is estimated (El-Manghani, 1981) that only 25 to 35 percent of the hides from animal slaughters are marketed, due to poor handling by butchers and ineffective market systems for commercialization. Current programs to provide facilities for drying and stretching of hides from official slaughterhouses should improve this situation, particularly for cattle. Due to the large number of on-farm sheep and goat slaughters, however, most of these hides will continue to be wasted.

All animals are the property of men. Women usually manage poultry and milking activities, and children are often utilized for herding. Very little is known about the sociology of animal husbandry in the YAR, although experience in the development of commercial poultry operations indicates farmers/producers respond rapidly to economic opportunities. Most on-farm poultry production is for subsistence needs, with approximately 15 percent of traditional flocks commercialized, usually within the immediate rural community.

Animal handling and nutrition are generally poor. Cultural beliefs require that young be weparated from mothers for the first five days after

birth, due to the belief that the first milk is harmful. This practice results in higher than normal animal mortality. Cattle are typically kept in the house without adequate nutrition or access to sunlight, resulting in poor animal performance. Breeding practices are generally based on folk beliefs rather than science resulting in low conception rates. Males and females are separated except when it is believed the female is in heat.

Veterinary services are provided under the British project, but veterinary project training activities have been plagued by recruiting and retention problems.

The feedlot operation at Garabi has been a failure due to lack of an economic basis for operation. Currently, that station is starting to provide limited animal research.

Range land is poor and not effectively managed, and there are currently no programs to remedy the situation. There is no livestock extension program.

Table III.24  
Changes in Numbers of Agricultural Animals in YAR 1976-1980

Type	1976 Number (000's)	1980 Number (000's)	% Change
Cattle	800	883	+10.4
Sheep and goats	3,460	3,751	+8.4
Camels	60	57	-5.0
Horses	3	3	n.c.
Donkeys	650	520	-20.0

Source: CPO, 1981, Table 7/3.

Table III.25.  
Changes in Animal Slaughters in YAR Governorate Capitals 1976-1980

Type	1976 Slaughters	1980 Slaughters	% Change
Cattle	38,546	78,780	+104.4
Sheep and goats	168,907	124,060	-26.6
Camels	485	7,044	+1,352.4

Source: CPO, 1981, Table 8/2.

Table III.26.  
Estimated Cattle Population and Performance, YAR, 1980

<u>Total Population</u>		883,000
<u>Estimated Head Composition</u>		-
Mature cows		451,000
Mature bulls		203,000
Immature animals		<u>229,000</u>
Total		883,000
<u>Annual Stock Movements</u>		
Mature cattle	654,000	
Mortality (5%)		32,700
Culling (12.5%)		<u>81,750</u>
Needed replacement		114,450
Calves born		231,000
Calves mortality first year (11%)		25,400
Slaughter first year (25%)		<u>57,750</u>
Animals surviving first year		147,850
Mortality to maturity (5%)		7,400
Slaughter to maturity		<u>26,000</u>
		114,450
<u>Annual Meat Production (tons/year)</u>		
81,750 culled animals		11,445
26,000 slaughtered immature animals		1,560
57,750 slaughtered calves		<u>1,730</u>
Total		14,735
<u>Annual Milk Production (tons/year)</u>		
50% of 451,000 cows lactating 5 months yielding 300 kg/yr		67,500
<u>Animal Skin Yield</u>		
Calves		57,750
Cattle		<u>107,750</u>
Total		165,500

Source: Calculated from CPO, 1981, Table 7/3, using the procedure described in El-Manshani, 1981, Annex 1.

Table III.27.  
Estimated Sheep and Goat Population and Performance, YAR, 1980

<u>Total Population</u>		3,751,000
<u>Estimated Flock Composition</u>		
Breeding females		2,465,000
Mature males		322,000
Immature animals		<u>964,000</u>
		3,751,000
<u>Annual Stock Movements</u>		
Breeding females	2,465,000	
Mortality (10%)		246,500
Culling (15%)		369,750
Mature males	322,000	
Mortality (10%)		32,200
Culling and slaughter (35%)		<u>112,700</u>
Need replacement		761,150
Animals born		1,972,000
Mortality (18%)		354,960
Slaughter (28%)		<u>552,160</u>
Reared to one year		1,064,880
Mortality to maturity (7%)		74,500
Slaughter to maturity		<u>229,230</u>
		761,150
<u>Annual Meat Production (tons)</u>		
482,450 culled/slaughtered mature animals		5,800
229,230 slaughtered immature over one year		2,100
552,160 slaughtered under one year		<u>4,100</u>
		12,000
<u>Annual Milk Production (tons)</u>		
2,465,000 breeding females yielding 10 kg/yr		24,650
<u>Annual Skin Yield</u>		
Under one year		552,160
Older than one year		<u>711,680</u>
		1,263,840

Source: Calculated from CPO, 1981, Table 7/3, using the procedure described in El-Manshani, 1981, Annex 1.

Table III.28.  
Estimated Annual Meat & Milk Production in YAR - 1980  
(Tons)

	Meat	Milk
Cattle	14,735	67,500
Sheep and goats	12,000	24,650 <sup>b</sup>
Camels	634 <sup>a</sup>	750 <sup>b</sup>
	<u>27,369</u>	<u>92,900</u>

a. based on governorate capital slaughters.

b. El-Manshani, 1981 estimate.

Source: Tables III.26, III.27; CPO, 1981, Table 8/3.

Table III.29  
Meat and Animal Production and Imports in YAR 1976-1980  
(Tons except live animals, actual no.)

	1976 Imports	Production	1980 Imports	Production
Cattle (live) <sup>a</sup>	18,388	n.a.	8,000	n.a.
Meat	---	12,500	2,000	10,919
Milk	---	60,000	900	64,000
Butter	1,200	1,613	9,500	1,745
Evaporated milk	2,500	---	10,000	---
Dry milk	4,000	---	23,000	---
Cheese	400	2,884	1,300	3,120
Skim milk	---	36,096	---	39,044
Sheep (live) <sup>a</sup>	76,414	n.a.	80,000	n.a.
Exports	1,100	---	15,000	---
Meat	---	12,600	---	12,900
Goats (live)	138	---	25,000	---
Meat	---	26,750	---	37,500
Chickens (live)	---	n.a.	910,000	n.a.
Meat	755	1,400	48,000	1,485
Eggs (tons)	---	9,975	5,500	10,700
Eggs (thousands)	---	210,000,000	n.a.	226,000,000

Source: FAO, 1981

a. These figures are subject to considerable variation during the first half of 1981. CPO estimates for sheep and goat imports were 64,000, for cattle, 5,100 and 265,000 for live chickens.

## Fishery Operations

Production of fish is an important activity in the coastal regions of the YAR. Estimates of fishery production range from 12,675 to 21,200 tons annually (see Table III.3). Fishery potential has not been studied in any detail but preliminary estimates as high as 30,000 tons have been proposed. In the absence of accurate catch statistics and limited information about potential, a project has been started to greatly expand fishery production and processing through extensive infrastructure development and capital investment. Although this project will contribute to a more effective infrastructure for the handling of the catch, the emphasis is apparently being placed on increasing the size of the catch. In the absence of accurate information on fishing potential, the likelihood of over fishing would appear to be great. This is particularly true in the case of foreign fishing agreements currently being discussed. Project officials are apparently unaware of the harvesting capacity of modern commercial trawlers.

Table III.30 .  
 FAO Estimated Fishery Production in YAR 1976-1981  
 (Tons)

Local	1976	1977	1978	1979	1980	1981
Demersal fresh	3,300	3,500	4,037	4,100	4,200	4,300
Pelagic fresh	13,200	14,000	15,500	16,200	16,900	17,600
Cephalapods	1,000	300	-----	-----	-----	-----
Total a	<u>17,500</u>	<u>17,800</u>	<u>19,537</u>	<u>20,300</u>	<u>21,200</u>	<u>21,900</u>
Total b	14,000	16,500	17,500	17,500	N/A	N/A
Total c	-----	-----	-----	12,675	-----	-----
Imports	2,764	1,482	1,502	900 <sup>a</sup>	N/A	N/A
Exports	3,295	3,067	2,590	1,000 <sup>a</sup>	N/A	N/A

Source: FAO Food Supply Analysis, 1981: MOA, Department of Fisheries Estimates, 1981.

- a. FAO estimate maximum production estimated at 30,000 tons/year.  
 b. MOA estimate.  
 c. El-Menshani, 1981 Annex 1, P 6. He cites catches follows:

	(percent of Total)
Indian Mackerel	27.0
Spanish Mackerel	21.0
Tuna	10.0
Anchovies and Sardines	9.0
Other	33.0
	<u>100.0</u>

### III.5. Marketing

Agricultural products in the YAR are handled by two separate and distinct types of marketing systems. The locally produced products are handled by a traditional periodic market system, while imported goods are most commonly marketed through a commercial market organization consisting of importers, wholesalers, and retailers. There is little government intervention in marketing activities, and there is little information available to evaluate the operations of either the commercial or traditional sectors. Livestock marketing is described in detail in El-Meshani (1981).

Most areas of rural YAR are served by periodic markets meeting on a weekly basis and serving as both sources of supply for household inputs and bulking points for agricultural products. Historically, these markets are served by traveling merchants who visit several markets collecting products and selling or reselling agricultural products and other merchandise.

Most rural markets are isolated and lack adequate transport and communication infrastructure, resulting in poor market information and higher than necessary prices. At the same time, however, increased availability of vehicles and increasing demand for goods in rural areas appears to have increased the availability of transportation. In general, rural markets lack necessary facilities for proper handling of agricultural produce because of their limited utilization. This is a particular problem in the handling of fresh meat and other perishable produce.

Most domestically produced agricultural produce is consumed on the farm or sold by the farmer in the local market directly to consumers, or in the case of fruits and vegetables, to a wholesaler for movement into urban areas. It is unusual for wholesalers to purchase goods at the farm. Market transactions are generally conducted directly between the farmer and the purchaser, with prices negotiated for each transaction. There is no attempt to standard-

ize either the units of sale or the quality of the goods. Occasionally, an agent is employed in the sale of livestock. When an agent is used, he is paid a commission.

The traditional system is characterized by specialization of sellers and wholesalers by product. Imported food products are not commonly sold at the periodic markets, with the exception of smuggled imports which have not entered normal commercial channels, and wheat or fruit which are produced domestically in very limited quantities.

Imported goods are marketed through a standard multistage marketing channel including an importer, wholesaler, retailer, and occasionally other intermediaries. Commercial merchants carry a wide range of goods and products and usually make large investments in infrastructure, including transportation and storage facilities.

Commercial retailers operate on a daily basis rather than weekly, and imported goods are standardized as to grade and quantity. Imported goods delivered through the commercial system are universally cheaper than domestically produced items.

YARG and foreign donors have been active in the construction and improvement of roads, but except for the fish market development in Hodeidah, the storage facilities for imported grain and the Hodeidah central gat market, development of physical infrastructure outside the control of the private merchants has been non-existent.

The government has created two institutions to control imported goods: The General Corporation for Foreign Trade, and the Consumers Corporation for Government Employees. The impact of these agencies in the marketplace is not yet evident. The Ministry of Trade and Supply has set official margins for imported foodstuffs and standard wholesale and retail prices. A series of inspectors is used to collect price information and enforce these regulations. Although this information could be used to increase the market research

capabilities in the Ministry of Agriculture or the Ministry of Supply, it is not currently being used. The Agricultural Research Service in Taiz has begun collection of market prices for some commodities.

Profit margins on imported goods are set by law following a format established in Egyptian and Sudanese law. (see Table III.31). These margins are set at three levels. The importer is permitted a certain percentage profit based upon the import price. He may then charge a percentage of the same price for administrative expenditures. Loading fees, transportation fees and unloading fees set by the Labor Office, the Transportation Office and the Labor Office respectively can then be added to determine the price to the wholesaler.

At the wholesale level, the wholesaler is again permitted a certain percentage of the imported price for profit. He can also add a percentage of the same price for administrative expenses, he can add a percentage for cold storage expenses, and then again expenses for loading, transportation and unloading. The retailer may take a certain percentage of profit on the total value. They can add a percentage for service and transportation expenses as determined by the General Director of Supply Affairs. When these are added together it establishes a retail price that may be charged on the imported goods.

The General Corporation for Foreign Trade is responsible for collecting and providing import price information. Auditors from the Ministry of Supply have responsibility for checking conformance at the wholesale and retail level. The Ministry currently has around 120 auditors to cover the country or approximately ten for each governate. They are currently sending some of these auditors to Syria for further training.

The retail prices determined by the auditors are reported to the Ministry of Supply and become the retail prices used by the CPO for determining the consumer price index for the major cities. These retail prices are published weekly. The auditors are responsible for collecting price information on both imported and domestic goods.

While the auditors from the Ministry of Supply report retail food data, they are also responsible for reporting violations of the prices set by the Ministry. Conviction on these violations can result in fines and jail sentences. However, a complaint by citizens in one village resulted in an investigation and a fine of YR 750 to all of the meat retailers in the local souk. However, when the markets reopened the next week, the retail prices of meat were the same as the week before. Thus the effectiveness of the audit system and associated penalties may be open to question.

It is interesting to note that Yemeni consumers prefer domestically produced products over imported products in many, if not in all, cases. Examples are retail prices of locally produced, factory-type broilers present in the market for YR 11 while a small, native bird is seen in the same markets selling from 35 to 40 YR. Similar price differentials exist for imported and domestic wheat and other products (see Table III.32.). Such differentials make utilization of import duties as a mechanism for raising the price of imported goods to encourage the production of domestic goods rather doubtful. Duties would have to be raised to such a level that the primary result would probably be an increase in smuggled goods and a decrease of officially entering goods. Devaluation of the YR could provide an alternative that might achieve this result.

Table III.31  
OFFICIAL PRICE AND PROFIT TARGETS FOR IMPORTED AGRICULTURAL PRODUCTS IN YAR, 1981

Product	Importer			Wholesaler			Retailer		
	Price Basis	Profit	Other Costs Allowable	Price Basis	Profit	Other Costs Allowable	Price Basis	Profit	Other Costs Allowable
Wheat & wheat flour	(government accepted bid basis)			Import bid price	3%	Admin. 0.5%, handling & transport	Total costs	6%	Handling & transport at official rates
Meat & poultry	FOB, CIF price	5% of CIF	Admin. 2%, cold storage 0.5%, duty, handling & storage at cost	Imported price	3%	Admin. 1%, cold storage 0.5%, handling & transport at official rates	Total costs	10%	Handling and transport 1.5%
Eggs	FOB, CIF price	8% of CIF	Banking 2%, admin. 2%, cold storage 0.5%, duty, storage at cost, transport at official rates	Imported price	3%	Admin. 1%, cold storage 0.5%, handling & transport at official rates	Wholesale price	10%	Handling & transport 1.5%
Fresh fruit	FOB, CIF price	6% of CIF	Banking 2%, admin. 2%, duty & handling at cost, transport at official rates	Imported price	2%	Admin. 1%, handling & transport at official rates	Wholesale price	10%	Handling 1.5%
Coffee	FOB, CIF	4% of CIF	Banking 2%, admin. 1%, duty & handling at cost, transport at official rates	Imported price	2%	Admin 0.5%, transport & handling at official rates	Wholesale price	6%	Handling & transport 1%

Source: Ministry of Supply, 1981

Table III. 32.  
 RETAIL PRICES IN YR FOR DOMESTIC AND IMPORTED FOOD PRODUCTS  
 IN TAIZ, YAR, 1981

Product	Price for Domestic Product	Price for Imported Product
Poultry (kg)	35 <sup>a</sup>	11 <sup>b</sup>
Eggs (dozen)	10	8
Beef meat (kg)	50	24 <sup>b</sup>
Wheat (kg)	3.25	2.50

a. live weight  
 b. frozen

Source: Data supplied by Agricultural Research Service, Taiz; compiled by J. Allchin, World Bank, 1981.

The food marketing system usually operates as a dual system, separating the handling of imported goods from domestic products. The rural economy is considered a largely subsistence system, but as farm incomes increase, and market roads are improved, the rural areas are increasingly being integrated into the total system (see Table III.33.).

In traditional market operations, farmers bring their products to the weekly market where they trade with other rural producers or to wholesalers bulky products for movement to the urban areas. The share of domestically produced products marketed is small, but examination of the production and consumption data for several important crops indicates that this system may be changing in importance.

Table III.33.  
ESTIMATED MARKETINGS AND POINT OF INITIAL SALE  
FOR SELECTED AGRICULTURAL PRODUCTS IN YAR, 1981

Commodity	Total Production Marketed (1981)	Point of Initial Sale (% of sales)		
		Farm	Local Market	Urban Market
Sorghum	12	30	60	10
Millet	5	60	35	5
Wheat	4	50	50	--
Maize	75	n.a.	n.a.	n.a.
Pulses	60	15	70	15
Potatoes	80	25	55	20
Tomatoes	85	5	70	25
Grapes	90	15	10	75
Meat	45	30	40	30
Poultry	20	45	45	10
Eggs	20	60	40	--
Fish	85	5 <sup>a</sup>	15	80
Milk	8	100	--	--

Source: provisional estimates by Agricultural Research Service, Taiz,  
and by J. Allchin, World Bank, 1981.

a. At landing.

In 1976, production of cereals in YAR exceeded the consumption needs of the agricultural population by 119,222 tons as shown in table III. 34. By 1980, significant changes had occurred. Imports of cereals increased by 248 percent while domestic production declined by 17 percent. As a result, the marketable surplus in the agricultural sector has become a deficit. As rural tastes become more modern, wheat must now be moved into farming areas to satisfy the cereal shortage and to meet consumer wants. At the same time marketable surpluses are developing rapidly in root crops, fruits and vegetables. Wholesalers have developed systems for moving these products out of the rural areas into urban areas, but improvements in the infrastructure, particularly cold storage and improved road networks, should be able to improve product quality and reduce waste. The current system, however, does a remarkable job of moving perishable products between farm and markets while providing adequate returns to farmers (see Table III.35.).

Although consumers are willing to pay premium prices for domestically produced foodstuffs as indicated by the data in Table III.32, estimated marketing of cereals and poultry in the traditional systems are low and largely confined to the rural areas as shown in Table III.33.

Table III. 34.  
Production and Consumption of Selected Food Products  
In YAR 1976 & 1980

(Tons)

	Cereals		Potatoes		Tomatoes		Grapes	
	<u>1976</u>	<u>1980</u>	<u>1976</u>	<u>1980</u>	<u>1976</u>	<u>1980</u>	<u>1976</u>	<u>1980</u>
Domestic production	787,405	651,171	59,800	94,700	165,389	209,700	38,160	44,100
Imports	83,758	289,646	74	-----	766	4,000	-----	-----
Exports	-----	-----	-----	-----	-----	900	-----	-----
Domestic consumption	871,163	940,817	59,726	94,700	166,905	207,001	38,160	44,100
Agricultural population as percent of total population	76.7	74.9	76.7	74.9	76.4	74.9	76.4	74.9
Marketable surplus from agricultural sector:								
Production	787,405	651,171	59,800	94,700	165,389	209,700	38,160	44,100
Consumption	<u>668,182</u>	<u>704,671</u>	<u>45,809</u>	<u>70,930</u>	<u>127,515</u>	<u>155,043</u>	<u>29,108</u>	<u>33,031</u>
Surplus	119,223	(53,500)	13,990	23,769	37,874	54,657	9,052	11,069

Table III.35.

ESTIMATED SHARES OF CONSUMER PRICES FOR SELECTED FRUIT & VEGETABLE PRODUCTS  
ACCRUING TO MARKETING SYSTEM PARTICIPANTS IN YAR, 1981

Product	Farmgate.		Wholesaler		Retail	
	Price (YR/kg)	Share of Retail Price (%)	Price (YR/kg)	Share of Retail Price (%)	Price (YR/kg)	Share of Retail Price (%)
Tomatoes	3.28	42.1	6.05	35.6	7.79	22.3
Potatoes	2.68	56.4	3.80	23.6	4.75	20.0
Grapes	12.21	64.6	13.75	8.2	18.89	27.2

Source: Data supplied by Agricultural Research Service, Taiz, compiled by J. Allchin, World Bank, 1981.

Like the marketing of other agricultural products, the marketing of livestock can be separated into two distinct systems: a traditional system for local products and a modern commercial system for imported products. The traditional system is specialized by product, while the modern system handles a wide range of products. The general lack of adequate market facilities in the traditional sector appears to increase costs more than the modern system. Estimates of sales are shown in Table III.36.

Table III. 36.  
ESTIMATED VOLUME OF LIVESTOCK MARKETED IN YAR, 1980

	Cattle	Sheep & Goats
Total culled/slaughtered	165,500	1,263,840
Home slaughter <sup>a</sup>	31,350	884,688
Animals sold for slaughter	134,150	379,152
Animals sold for husbandry <sup>b</sup>	67,070	126,384
Total animals sold	201,220	505,536
Imported animals	7,000 <sup>(est)</sup>	160,000 <sup>(est)</sup>
Total animals marketed	208,220	665,536

a. 19% for cattle; 70% for sheep and goats

b. 34% for cattle; 25% for sheep and goats

## Consumption

The food production and marketing system in YAR appears to be providing an adequate diet for most of the population and there are essentially no food exports. YAR is very heavily dependent upon food imports to meet domestic needs. Although the figures may be subject to error because of inaccurate population estimates, the data presented in Tabel III.37 indicate adequate calorie and protein intake from typical diets. Tabel III.38 indicates some significant changes in dietary patterns. Animal products are becoming increasingly important as sources of protein and calories, while wheat is replacing sorghum as the major cereal grain in many diets. The shift to wheat is significant, as it represents a strong demand for imported cereal in preference to domestic sorghum. The shift to increased animal products may reflect increased poultry consumption which is being met by imports but for which a domestic industry is rapidly developing. Table III.43 outlines the quantities of products in a typical annual diet in YAR.

Table III.37  
Changes in Dietary Contribution of Various Food Products in YAR 1976-1980  
(per capita basis)

Food Product	Calories		Protein (mg)	
	1976	1980	1976	1980
Cereals	1,536	1,520	44,069	43,577
Roots and tubers	22	31	516	742
Pulses	117	112	7,584	7,252
Vegetables	19	21	1,192	1,340
Fruit	120	105	1,109	995
Meat and offal	85	103	5,851	7,660
Milk	72	87	4,813	5,945
Eggs	7	7	530	518
Fish	10	8	1,363	1,196
Other	291	246	771	754
Total	2,279	2,240	67,798	69,979

Source: FAO, 1981. Need study of consumption to answer nutrition questions.

Although dietary analyses and observations in the country indicate that malnutrition is not a major problem in YAR, several studies indicate that there may be infant and child nutrition problems in some areas.

A survey of 100 families in the Zabid area conducted by Stern (1981) indicated there may be some nutritional deficiency diseases among the children of the Tihama. The study indicated that only 23 of 57 children were breastfed, while 31 of 57 received only powdered milk or animal milk only. Three received both. Eight of 31 bottlefed children were never breastfed, and most children were taken from the breast at less than six months. Discussions with mothers indicated that knowledge of appropriate food patterns for children was limited and local foods were given without consideration of appropriateness.

The most common children's disease was malaria, with considerable heat rash. Diarrhea and vomiting were common among bottlefed children, and many children appeared to be anemic. Four clear cases of marasmus, two of kwashiorkor and ten of rickets were found in 57 children. Infant mortality was reported to be about 50 percent. Stern suggested a procedure was needed to emphasize the benefits of breastfeeding, discuss weaning foods, and explain the prevention and treatment of anemia.

Table III.38  
CHANGES IN COMPOSITION OF DIETARY COMPONENTS IN Y.A.R.  
1976 - 1980

	(percentages in parentheses)		Protein (mg)	
	Calories (%)		1976	1980
	1976	1980	1976	1980
Total	2,279 (100)	2,240 (100)	67,798 (100)	69,979 (100)
Animal	202 (8.9)	239 (10.7)	12,597 (18.6)	15,364 (22.0)
Vegetable	2,077 (90.1)	2,001 (89.3)	55,201 (81.4)	54,615 (78.0)
Cereals <sup>a</sup>	1,536 (100)	1,520 (100)	44,069 (100)	43,577 (100)
Wheat	336 (21.9)	527 (34.7)	9,885 (22.4)	15,502 (35.6)
Rice	11 (0.7)	17 (1.1)	209 (0.5)	296 (0.7)
Barley	74 (4.8)	48 (3.2)	1,865 (4.2)	1,233 (4.1)
Maize	104 (6.8)	125 (8.2)	2,590 (5.9)	3,116 (7.2)
Sorghum	1,008 (65.6)	801 (52.7)	29,502 (66.9)	23,430 (53.8)

Source: FAO, 1981.

a. Totals may not add due to inclusion of small amounts of other cereals.

Earlier surveys by Mitouchev and Bornstein (1973) in the Tihama, Western Slopes and Intermediate Plains indicated that nutrition behavior in the family tended to harm the most vulnerable individuals. For example, pregnant women do not receive any special diet, although after giving birth they receive special culturally prescribed foods--chicken, butter, honey, fresh vegetables and dates--for 40 days.

Breast feeding begins after a three day period during which the child receives sweetened water and butter. Children, particularly males, are breastfed for 2 years unless pregnancy occurs or there is a lack of milk. Weaning practices tend to be ad hoc. Poor sanitation generally surrounds infant feeding, particularly if bottle fed, leading to often fatal gastrointestinal disorders. Their survey results, indicate children in the Tihama may be smaller than standard.

### III.6. Social Institutions and Constraints

An understanding of the social system in the YAR is essential to evaluation of the agricultural sector. As a part of the project papers for the CID CORE and poultry projects, Kearns has examined the sociocultural environment in the YAR in depth (see Annex A to the CORE paper, or Annex D - to the poultry project paper). This section is based on those discussions and additional insights based on discussions with Yemeni Farmers.

The essence of a definition of social structure is the social relations and behavior of members of the society. The actual behavior of individuals, the social standards, the ideal patterns, the structure of expectations, and all considered as important constituents of a social structure. Social structure cannot be considered as something static, but should be viewed as dynamic. It may also be considered as both a process and a product. In every community, the social relations, either between individuals or groups, form the internal units of social structure.

" 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 percent 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."

(CDSS, 1978)

Underlying most organizational units in Yemen are certain indications of social status. The strata within the Muslim scheme are discussed later in this section, but since the ownership of land is a commonly accepted indicator of social status, it is presented here. Yemenis who own land are of a higher social status than those who do not. Land tenure is still largely feudal, as most small farmers are sharecroppers on land rented from large landowners. The share arrangements vary according to irrigation or non-irrigated land, as well as other factors. Generally, the share arrangements range from one-quarter of the crop to one-half of the crop as the landholder's share.

A 1973 FAO study estimated that 60 to 70 percent of arable land was privately owned, 15 to 20 percent was held by religious groups, 2 to 3 percent was in state farms, and 1 to 3 percent was owned collectively. Approximately 90 percent of pasture land is collectively owned.

In many cases land ownership is not firmly established; multiple ownership claims represent a large proportion of the disputes brought before the sheikhs and other local officials. Farmers generally verbally claim to own the land they work even if they give a share of the crop to someone else, and rich landlords often boast of owning all the land the eye can see and more. In the highlands, holdings are often counted in terraces rather than hectares.

The assumption is that in order to meet rural development objectives, developing countries must have organizations that are active on a local level. When local organizations deal with local people, the general assumption is that such organizations will be more accountable and responsive to local needs. There is evidence, however, that LDAs are not strongly supported by the local citizenry, especially in northern areas.

### Kinship Group

The most basic and exceedingly important social unit is the household or family. In some field research, the term respondents seemed most comfortable with was "kitchen". This definitely implies not only that household members share their meals, but that they share responsibility for putting meals on the table.

The most common living situation throughout Yemen is the extended patriarchal family. A typical household consists of a man, his wife or wives, his married sons with their wives and children, his unmarried children, and possibly other relatives such as widowed or divorced mothers or sisters. After the death of the father, each married son ideally establishes his own household. Children grow up sharing meals with parents, siblings, father's siblings and wives and children as well as grandparents. Polygamy, high rates of migration, divorce and infant mortality create endless variations in the above described pattern. Few households consist of only the nuclear family. Women who do not share a kitchen with other adult females are considered by some to be living alone--many households function without men, but a YAR kitchen does not exist without a woman. Absent males are considered part of the household as long as they do not have a separate household elsewhere. It appears that men living away from their families prefer to live with other members of the kin group or with fellow tribesmen.

The division of responsibility and authority within the household varies according to number, sex, age and personalities of members. In most extended families, the grandfather would be undisputed head of the household. Generally, girls marry men older than themselves, and as a result may be widowed at a relatively early age and therefore assume management of a household.

Husbands, wives and siblings normally retain separate ownership of land inherited from their parents, but generally family members cooperate in farming.

It is expected that the individual will subordinate personal interests to those of the family, as group interests are more important than individual interests. Child-rearing practices further encourage children to be members of a group rather than individuals.

People who live within a tribal group or in a large family usually try to extend themselves, because the tribe will not be well known unless the members are many.

Families prefer to have their daughters marry from the same family. For example, for males who come from the Southern Uplands, it is very difficult to get a wife from the Intermountain Plains area, and that is why the bride's marriage portion is so high.

In some cases, males in urban areas can get a wife from a rural area, but the contrary is not true. A farmer does not like to have women from the city, because women in the city cannot do the same job as rural women.

#### : Religion

One of the strongest organizations/influences in the Yemen Arab Republic is Islam. In broadest terms, south arabian societies break down into five strata that more or less parallel the strata found in the ancient kingdoms. At the top of the hierarchy stand the Sayyids, who claim descent from the Prophet Muhammad and, as a concomitant, religious and spiritual superiority. A stratum of hereditary holy men of Qahtani or south Arabian ancestry, variously known as mashaykh (sing., shaykh) or qadis (sing., qadi) comes next. In many areas they share equivalent rank but do not intermarry with the next stratum, the tribes (gubayl; sing., gabila). Below the tribes are artisans and merchants in respectable trades, who enjoy superiority to families who practice despised trades. The lowest social group, the akhdam (sing., khadam), occupies a position so disdained that it does not, for practical purposes, belong to ordinary society. (Area Handbook, 1977).

Present-day Yemeni 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 may 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 the Akhdam, and the activity will not be successful.

A part of the Muslim regulations or customs is that the chief (shaykh) is the most important man in the village, and he is the key to have the farmers convinced about an agricultural project. The shaykh is the person who will speak for the people in the village. He is, also, the responsible man in having guests from outside the village, and he will be paid by the farmers, from the religious tax (zakat).

The washaykh (sing., shaykh) are divided into three groups:

Chief of the chiefs (or shaykh al-mashaykh), who will be elected from the chiefs of different villages, and who will be in charge in solving the problems the chiefs face;

Chief (shaykh), who will be elected from the farmers in different villages in one area;

a third group is called augal (sing., agel), or wise. He is the responsible man for one village only.

In developing agricultural projects, it will help if shaykhs and augal can be gathered. They will extend the explanation for farmers and make it understood.

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 fast during Ramadan, declaration of faith by reciting the Shadadah, and at least a once-in-a-lifetime pilgrimage to Mecca, the Muslim influence is powerful in the daily life of the people. Marriage customs, sex roles, divorce, 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 a blessing. In an Islamic court, a woman can only inherit half of what a man can legally inherit, while in court the women's word counts for half of a man's testimony.

The Yemeni 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 executes the court's judgements. In addition to the tribal courts and the Sharia courts, the government administers the civil cases.

Cultural norms and early marriages with the resulting early childbearing serve to exclude the majority of women from the educational system and keep 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 usually in a protected position, since her marriageability is at stake. The few Yemeni women who are in professional positions are generally of the Sayyid or Qadhi elite. This pattern of the elite women being educated first and taking the first professional positions is evident throughout the Middle East.

The elite religious classes are usually the wealthiest groups, but the Sayyid dominance is based on more than economic factors. The Sayyids as a group are active in the educational system, and a large proportion are literate. Other classes acquire much of their knowledge during migration work searches rather than attendance at schools.

When attempting to institute programs, consideration must be given to relevant aspects of the Muslim regulations or customs. Local religious leaders must be consulted, informed and their cooperation sought prior to the initiation of any projects or programs. In addition, a deliberate effort must be made to keep such leaders "up to date" on the progress of individual projects.

## Characteristics and Functions of Leadership

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 little understood and basically uncontrollable. The country is a mixture of Islamic traditionalism, modern inventions, various levels of poverty, widespread new wealth, age-old elitism, new technology and primitive labor patterns. 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 Twentieth Century.

Theoretically, within a tribe all tribesmen are equal and the shaykh is in the leadership position. Shaykhs may be elected by all members of the group or may be selected from certain leading families; or the position remains hereditary within a single extended family. Currently, some Yemeni communities have two shaykhs. One who is "old" may be recognized as "the power" while the "young shaykh" is recognized as the change agent. The young shaykh probably possesses more education than the old shaykh and he probably is a member of an old shaykh family. This seeming split in authority is a relatively new phenomenon in Yemen, and is an indication of the changing leadership roles.

The rapidity and extent of social change in Yemen is bringing about a redefinition of leadership and authority roles. Three of the most significant changes which influence leadership are consumption patterns, immigration and remittances, and the 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 workforce outside the country provides the means for more people to buy the increased consumer goods. Social

change which such consumer goods brings about can only be estimated. The introduction of radio or television into a village will enable villagers to acquire knowledge from sources other than traditional village sources. In addition, the import of outside influences may be seen in modifications of family patterns and/or authority.

Labor migration and remittances resulting from this migration certainly contribute to the changing role of leadership and authority.

#### Women's Role

The role of women has been viewed by several observers of Yemen life as changing. Generally, women marry young, with the average female marriage age at around 14 years. Women also are expected by society to have children, and the average is 6.8 live births per woman. 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 on many traditionally male tasks. Nowhere is that more evident than in the rural agricultural labor force. Emigration and recent progress in family planning are expected to result in a decreased birth rate. This could result in children being less of a burden to the woman and may ultimately enable women to gain more economic power than previously. This may also result in more educational opportunities for girls, 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 some of the existing 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 ongoing observation of the changing social scene.

### Patterns of Mobility

The most striking example of mobility in Yemen is the outward labor migration. This extensive migration results in internal labor shortages. Since remittances are sent to or ultimately benefit the portion of the population who stayed at home, the obvious material benefits are seen in increased consumer goods. Migration as it now exists contributes to the direct diffusion of innovation in the country in various ways. The most obvious spread takes place when the men return to the YAR with information, goods, and/or skills from other geographic regions in which they spent their term of migration. However, the point to be made here is that the bulk of information brought to Yemen is representative of a non-Yemen country. 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 burn and slash farming but the project being advanced in the village is poultry raising, the information will clash. In fact, the returnee may actually fight against the village project. Therefore, the spread effect relative to the migratory force cannot be "counted upon" as a positive meaningful method of dissemination of information.

On several occasions, wives of workers who previously migrated commented upon the fact that when the husbands returned they demanded different vegetables (from those usually served in the home) to be served at meal times. The wives indicated that they tried the new vegetables because of their husbands' insistence. These vegetables then became part of the families' diet. The general acceptance of recently introduced (imported) fruits may also have been stimulated by returning workers.

### Allocation of Time

Time in Yemen is viewed differently than in western society. The clock is not always in a position of dominance, and being "on time" is more loosely defined. Time is somewhat flexible, and tomorrow is always waiting if something is not accomplished today. The Muslim calendar is a lunar calendar, and so 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 and discussions. Time spent in such initial information sharing will pay off later as the project progresses, as it will help promote understanding and acceptance on the part of the local people.

Necessary time allocation for individual aspects of the project should be reviewed frequently relative to geographic region, as well as other factors. In addition, as specific participants are identified, a review will be undertaken in order to assess the amount of discretionary time available to the participants.

Research relative to the allocation of time to specific tasks does not yet exist in the YAR. Interviews with Fatima Fadel, Fawzia Numan and Ashwag Al Shafi of the Women's Department in the Ministry of Education about allocation of time concluded that no such research exists. This information would be difficult to gain from rural male and female farmers, since the concept of allocation of time would not be understandable.

The Report on Women's Economic Activities in Mahweet, Tawila and Jihana Regions by Carapico and Hart (1977) noted that Yemeni women, especially those in villages, are unaccustomed to giving explanations. It is relatively impossible to get the women to describe a process for doing some task. It is

difficult for the women to enumerate how many times an activity is undertaken or how long such an activity requires.

In interviews with male farmers in rural areas east, west, north and south of Sana'a, they estimated that all of their time went into farming and marketing if they marketed their own produce. Female farmers in the same geographic areas said that the amount of time devoted to house work or field work varied according to the seasons. During planting and harvesting, they spent more time outdoors than at other times, when there was not as much field work.

Fewer women appear to participate in marketing activities, but this activity should not be overlooked when reviewing work time for women. In the Taiz area it is relatively common to see women selling qat, straw products and vegetables. Women in the market in Sana'a are still fairly limited in number, but in the two years since this writer's first visit to the YAR, the number of women in the Sana'a market has increased. In August, 1981, women were selling incense burners, straw baskets, poultry and vegetables in the Sana'a souk. The numbers of women observed selling in the market was still very small, but nevertheless they are making inroads into the retail market.

Female farmers rarely talk to male farmers, but they can describe and explain any task process in detail to other females, native or foreign. Therefore, if any information is needed from female farmers, it is better to have a female talk to them.

With regard to the social concerns, relations among social groups depend on the area or the place we are talking about. It could be true in the eastern areas that persons of superior rank may not respond to persons of lesser social rank, but it is not so true in western or southern areas.

If an akhdam is put at the head of the project, the response of the mashaykh to take directions from the akhdam is similar to the 1930's response of the white American to the black. However, putting an akhdam in a project

activity and having him work in one of the project processes, but not as a head, will help much in working together, mashaykh and akhdam.

### III.7. Summary of the Current Status of Agriculture

The agriculture sector in the YAR has made significant gains over the past five years. Fruit and vegetable production has increased; production of chickens and eggs has made strong gains; cereal production has increased. Although there have been large expenditures on agriculture by YARG and donor agencies, production changes appear to have been in response to economic factors rather than in response to government planning or other development activities. Under current economic conditions, the greatest returns to farmers are achieved through production of fruits and vegetables and gat. Production of sorghum and millet is the least profitable use of farm labor. As a consequence, farmers have increased production of these higher valued crops, while maintaining only subsistence production of cereal grains. The marketable surplus of cereals has declined and dependence on imported foodstuffs has increased. There is no indication that these changes in production patterns have harmed the farmer. In fact, it appears that farm incomes in areas where high value crops can be grown have increased. Horticulture crops produce best on irrigated land. Consequently, there has been increasing interest in development of improved water sources, particularly ground water. The benefits of improved water management or at least water use are becoming recognized. Irrigated farmland using ground water has been increasing, and farmers appear willing to make personal investments in well construction.

The influence of development planning and research on agriculture has been limited. Effective development activities have taken place in the SURDP where the project has emphasized development of village water supplies. By working through local development agencies to meet a major concern of local populations, this project has generated considerable support in its project

area. The majority of effective extension workers operate in the SURDP and TDA project areas, but they receive only limited backup research information from ARS in Taiz.

Efforts to develop traditional cash crops of coffee and cotton have been a dismal failure. Due to changes in credit policy, cotton production has declined seriously. Coffee and cotton production is currently less than 10 percent of the target established in the first five year plan (see Table III.39.). There are only limited activities aimed at increasing coffee and cotton production by working with or supporting farmer activities through the TDA.

Although there is interest in citrus production as a cash crop, no data for economic evaluation are available.

Cereal production has increased 4.9 percent during the past five year plan and experience of the past two years indicates production is unlikely to increase more rapidly until cereal production can be made more attractive to farmers. Most cereal production continues to be dependent upon rainfall, and production is sensitive to climatic variation.

Fruit and vegetable production continues to show significant gains, and if the currently attractive returns to farmers continue, production should continue to increase. There is evidence that production of tomatoes currently exceeds the needs of the domestic market. This situation should result in reduction in return to farmers and may slow vegetable development. To avoid this situation in the future in other crops, market information must be generated and provided to farmers. There is currently no effective market intelligence system operating, although some retail price information is being developed in Taiz, and the MOA collects price figures in several areas. The price regulators function of the Ministry of Supply generates much of the needed information, but it is not effectively utilized.

The current status of livestock in the YAR is difficult to evaluate, due to the questionable census figures provided by CPO. Milk yields are clearly far below government targets and the limited commercial dairy activity has not made a significant impact. Based on official figures, meat production is lower than targeted, but if estimates for sheep and goats are doubled as suggested, production should be at least 90 percent of target.

Poultry and egg production have been the most successful parts of the agriculture sector. A commercial poultry industry has developed and on-farm production of meat and eggs is close to targeted figures. Again, however, it has been the clear economic advantage of broiler production that has fueled this development, not any planned development activity.

In general, development activities have failed due to a lack of knowledge about the Yemeni farmer. With the exception of the SURPD and TDA areas, there is a total lack of effective contact with individual farmers through extension services. Research activities have generally been developed without the involvement of Yemeni counterparts and without consultation with Yemeni farmers. As a consequence, no effective research base has been developed in any area of agriculture. There is no understanding of the functioning of the YAR farm household, and essentially nothing is known about farm strategies, attitudes, decisions and budgeting processes.

In summary, the agriculture sector has developed in response to economic factors rather than in response to planning. There is an inadequate base of information for development planning, and a very limited institutional structure for carrying out development activity. The lack of adequate human resources is uniformly recognized as the most significant barrier to agricultural development. This lack of institutional manpower to provide the link between development planners and the individual farmer has made development planning very difficult. Until such a network can be developed through training and establishment of lines of communication with individual farmers, the agricul-

ture sector will continue to evolve in response to market factors and external economic conditions independent of development activities. The commercial sector and the farmer have both responded effectively to change, introducing new products and employing new technologies as they become available and when their benefits can be effectively communicated to the farming community. Changes in the direction of agriculture are unlikely.

Table III.39.

## TARGET AND ACTUAL AGRICULTURAL PRODUCTION

IN YEAR (1979-80)

(000's Tons)

Crop	1980-81 Target <sup>a</sup>	1979-80 Actual	Percent of Target
Sorghum & millet	1,042	692.1	66.4
Maize	110	99.4	90.4
Barley	83	57.2	68.9
Wheat	128	52.6	41.1
Cotton	32	2.8	8.8
Oilseed (sesame)	11	6.0	54.5
Pulses (legumes)	105	79.6	75.8
Tobacco	8	7.0	87.5
Vegetables	705	253.7	36.0
Potatoes	360	127.2	35.3
Coffee	4	0.2	5.0
Fruits (including grapes)	142	130.1	91.6
<u>Livestock</u>			
Milk	367	92.9	25.3
Meat	43.7	27.4	62.7
Poultry	3.1	3.4	109.7
Eggs (millions)	235	200.0	85.1
a. From First Five Year Plan			

Source: CPO, 1981, and World Bank, 1979.

Outline of Revised Chapter IV  
Agricultural Sector Assessment for YAR

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## IV. ANALYSES AND RECOMMENDATIONS

National economic programs and policies designed for agricultural development can and do have a major impact on the ability of the agricultural industry to grow and prosper in serving its role as the producer and distributor of food and fiber for the nation. The programs, projects, and policies implemented to enhance agricultural development must undergird national development goals as well.

The industry of agriculture can be defined as a system of commodity subsectors. For analytical purposes, the commodity subsector model follows the production, marketing, and consumption of the commodity. An agricultural development project, program, or policy may impact on one or more parts of the sub-sector: agricultural inputs, farming, marketing, food processing, food distribution, and consumption. The project, program, or policy may also be designed to impact on one of the institutions servicing agriculture such as agricultural research, agricultural extension, agricultural education, and credit. Furthermore, in a macro sense, impacts on the agricultural sector and the general economy as a whole are important.

In this chapter, the YARG goals and objectives for the second five year plan (SFYP) are described along with existing projects, programs, and policies existing from the first five year plan (FFYP). After considering a set of assumptions inherent to the Yemeni society and the physical, economic, and institutional constraints to agricultural development, a qualitative analysis is presented that identifies the impact points within the subsectors and in the agricultural service institutions. Finally, some recommendations with priorities are suggested.

IV. 1. YARG Goals and Objectives for Second Five Year Plan

The general goals and objectives for the SFYP are similar to the FFYP. They include:

1. Following the path towards self-sufficiency in agricultural products within economic limits, taking into consideration population increases and raising the dietary standard of the people.
2. Insuring the requirements of existing and newly constructed agro-industrial projects for agricultural raw materials.
3. Reducing the balance of trade deficit in agricultural products by reducing the quantities of imports and increasing the quantities of exports for the most important agricultural products.
4. Improving the quality of agricultural products and increasing their strains.
5. Spreading vegetation throughout the country, especially fruit trees, woodlands, and meadows.
6. Supporting the small producer, water, and seeing that justice and settlements in agricultural relations are established.

7. A six percent per year increase in the GDP from the agricultural sector.

The strategy for achieving these objectives has been identified as follows:

1. Developing agricultural institutions and studying the administrative organization of the whole agricultural sector. The duties of every agricultural entity will be determined, contradictions eliminated and coordination and complementarity achieved.
2. Expanding agricultural research to provide for agricultural development needs, completing the regional network of research stations to deal with production conditions in different areas for producing new crops and testing new agricultural technology.
3. Developing agricultural extension to help farmers increase the productivity of their planted hectares. Providing extension centers in different agricultural areas with agricultural research and Agricultural Credit Bank programs.
4. Working to increase the return per hectare by improving production methods and diversifying crops, particularly food crops, working toward food security and achieving significant results in producing food crops so as to limit the expansion of Qat plantings.
5. Encouraging and increasing the savings to be invested in productive agriculture in response to the increasing needs for food products and agricultural inputs in the industrial sector.
6. Surveying and classifying agricultural lands to provide a scientific basis for investing in and maintaining terraces, and for increasing agricultural land productivity.
7. Making a complete survey of surface and ground water resources to provide a better base for economic and scientific decisions.
8. Building small dams, accelerating the implementation of irrigation projects, maintaining terraces and protecting agricultural soil.
9. Extending studies of prices, marketing and taxation for agricultural products. These will serve the policies of promoting agricultural production, encouraging the planting of new crops, decreasing the gaps in farmers' income relative to producers' income in the other economic sectors, and securing grain reserves in case of drought.
10. Extending and applying integrated rural development principles to Yemeni rural areas, giving the first priority to implementation of the rural development projects in the most needed areas.
11. Protecting the forests.
12. Providing all forms of agricultural credit to implement the goal of developing animal and crop production. The rate of interest for agricultural loans will be evaluated and Agricultural Credit Bank services will be extended to cover all agricultural areas.

13. Encouraging and promoting agricultural cooperatives appropriate to Yemeni rural conditions, providing legislation for the organization of agricultural cooperatives and training the necessary employees.

14. Establishing an organization for recording agricultural land ownership.

15. Establishing an equitable relationship between land owners and tenant farmers relative to the use of modern production inputs.

16. Extending veterinary services to animal production and aquaculture and encouraging the provision of fodder at the appropriate time and at reasonable prices.

17. Improving crop and livestock statistics, preparing outlook information for making economic decisions, and preparing the agricultural census with the assistance of the Central Planning Office.

18. Working with the Ministry of Education in completing the agricultural Institute in Surdud and the secondary veterinary school in Sanaa; operating Ibb Institute at full capacity, and revising the salaries and other allowances in order to provide employment stability.

19. Supporting the planning department at the ministry adequately and establishing evaluation mechanisms inside the large agricultural projects.

20. Providing sufficient quantity and quality of agricultural production inputs to support modern production methods.

21. Taking into consideration the integrated agricultural development plans of North and South Yemen and other Arabian peninsula and Gulf countries in a uniform strategy, coordinated planning, and trade and product specialization.

#### Planned Budget Allocations

The SFYP calls for 68 agricultural development projects with a total budget of 4.4 billion YR. Budget contributions are split nearly evenly between YARG and external assistance. (Table IV.1.). Forty percent of the budget is planned for the integrated rural development programs under regional development authorities. The Tihama Development Authority is budgeted for nearly one billion YR - 22% of the total budget. The Southern Uplands Rural Development Project is budgeted for its second phase as well as the Rada Rural Development Project. New projects to be initiated include Al Baun, Saadah, Hajjah, Al Mahweet, Khowlan, and Anis.

The largest external source expenditure area is for irrigation (543,000 YR) which, together with YARG inputs, will total one sixth of the budget. Livestock projects are to receive twice the amount of crops (14 and 7 percent respectively). The lowest budget is for Agricultural Extension (0.4 percent of total). Forestry, marketing, general construction, and planning and statistics are all below two percent of the total (Table IV.1).

TABLE IV. 1.

Agricultural Sector in the Second Five Year Plan.

Area	Number of Projects	Planned Investment (000 YR)			Percent of total by area
		YARG	External	Total	
Crops	11	251,894	61,271	312,165	7.1
Forestry	1	17,070	21,111	38,081	0.9
Research	2	75,348	133,614	208,962	4.7
Extension	2	15,157	1,500	16,657	0.4
Livestock	12	303,303	315,272	618,575	14.1
Irrigation	15	181,000	543,000	724,000	16.4
Marketing	1	27,005	29,125	56,030	1.3
Construction	3	76,712	22,580	99,292	2.3
Planning and Statistics	1	55,502	1,891	57,393	1.3
Integrated Rural Dev.	7	409,654	438,834	848,488	19.3
Tihama Dev. Authority	8	486,175	480,544	966,719	21.9
Fisheries	5	323,740	131,257	454,997	10.3
<b>Total</b>	<b>68</b>	<b>2,223,651</b>	<b>2,177,708</b>	<b>4,401,359</b>	<b>100.0</b>

During the SFYP, targeted percentage increases for the crop subsectors is 28.8% and for livestock, 44.9%. Forestry is expected to remain stable (no growth nor decline) and fisheries is targeted for a 57 percent growth (Tables IV. 2,3). Assuming constant prices at base year levels, 1980/81, these percentage increases also reflect planned changes in the value of production. These increases would result in a total value of production from the agricultural forestry and fisheries sector of 7.11 billion YR by 1986 - an increase of 32.8 percent over the base year figure of 5.35 billion YR.

In the crop subsectors, the largest gains are planned for cotton (316 percent) while the smallest is for sorghum (7.6 percent). Of the grain and fodder crops, maize is planned to increase the most (62.9 percent). Tonagewise, millet is the most important crop. Its planned growth is 17.6 percent. (Table IV. 2.).

In the livestock products area, white meat (basically poultry) is planned to rise by 75 percent -- more than three times that of red meat. Eggs are projected for a 56 percent increase and milk at 36 percent (Table IV. 3.). Fisheries production is planned at a 57 percent increase -- from 17,000 to 26,000 tons.

#### Crop Area and Crop Yields

Crop area is expected to decline for millet, sorghum, and barley but 15-20% yield increases will keep total production increasing for all other crops, area planted is expected to increase. Area planted increases are mostly in the 10-20% bracket except for cotton where hectareage is planned to increase 252%. Total area planted is projected to increase to 1,024,000 ha, an increase of slightly less than two percent from the base year hectareage of 1,004,500 (Table IV. 4).

Yield increases of 30 percent or more are planned for maize, wheat, cotton and vegetables. Sorghum and barley yield increases are set at 15% percent with potatoes and coffee at 20 percent (Table IV. 4).

#### Land and Water Resources

Ongoing projects from the FFYP are planned for expenditures of 1.2 billion YR for 1982-86 (Table IV. 5). About half are wadi development projects in the Tihama Development Authority and half for Wadi Al Jauf, Wadi Bena, construction of small weirs, and groundwater development.

In the SFYP, two new development projects (Marib Dam and Wadi La'a Irrigation) are budgeted for 520,000 YR. Water assessment projects and related land projects (108,000 YR) bring the total in the SFYP to 628,000 YR. (Table IV. 5).

Annual Budgets for Crops in the Period 1960-1964

for Agriculture by the Yemen Arab Republic

Government

Crop	Base Year			Fifth Year		Percentage Change (%)
	Quantity (000 Tons)	Price (YR/ton)	Value (000YR)	Quantity (000 tons)	Value (000YR)	
Millet	577.9	1750	1011.3	679.7	1189.5	17.6
Sorghum	39.0	2250	78.8	42.0	94.5	7.6
Maize	49.0	1600	78.4	79.7	127.7	62.9
Wheat	63.0	2500	157.5	91.0	227.5	44.4
Barley	42.5	1600	67.0	47.3	75.7	11.3
Cotton	5.0	3500	17.0	20.8	72.8	316.0
Dry vegetables	74.0	3000	222.0	81.4	244.2	10.0
Sesame	4.3	4500	19.4	5.5	24.8	27.9
Tobacco	6.8	8000	53.6	8.7	69.6	29.9
Vegetables	292.0	2100	613.2	417.3	786.3	42.9
Potatoes	120.0	2000	240.0	180.0	360.0	50.0
Fodders	133.0	500	66.0	180.0	90.0	30.3
Grapes	80.9	6000	425.4	88.6	531.6	25.0
Dates	6.3	4000	25.4	7.0	28.0	11.1
Coffee	3.8	25000	95.0	4.6	115.0	21.0
Coffee husks	2.5	25000	62.0	3.0	77.0	21.0
Other	67.0	5000	335.0	70.4	402.0	20.0
TOTAL	--	---	3577.8	--	4606.7	28.8

TABLE IV. 3

Production Value Targets for Livestock, Forestry, and Fisheries in the  
Second Five Year Plan for Agriculture by the YARG

Type	Unit	Base Year			Fifth Year		% Change (%)
		Price per unit	Quantity	Value (Mil.YR)	Quantity	Value (Mil.YR)	
Red meat	Ton	29,111	20,432	594.8	25,250	735.1	23.6
White meat	Ton	45,000	7,499	372.5	15,730	757.9	75.1
Milk	Ton	4,000	95,000	370.0	129,700	517.7	36.0
Eggs	Millions	0.50	122.4	61.2	191.1	95.6	56.1
Leather	Ton	1,125	4,720	5.4	6,626	7.5	37.5
Wool	Ton	2,000	1,800	3.6	1,790	3.8	5.0
Total livestock				<u>1,427.5</u>		<u>2,067.6</u>	<u>44.9</u>
Forestry	Thous.tons	150	1,270	192.0	1,270	192.0	0.0
Fisheries	Tons	9,000	17,000	153.0	26,761	240.8	57.4

TABLE IV. 4

Area and Yield Targets for Crops in the  
Second Five Year Plan for Agriculture by the YARG

Crop	Area (000 h.a.)			Yields (k.g. per h.a.)		
	Base 1980/81	1986	Change	Base 1980/81	1986	Change
Millet	602.0	59.0	- 2.0	960	1,152	20.0
Sorghum	78.0	73.0	- 6.4	500	575	15.0
Maize	35.0	42.0	20.0	1,400	1,900	30.7
Wheat	63.0	70.0	11.1	1,000	1,300	30.0
Barley	46.8	45.1	- 4.0	908	1,050	15.6
Cotton	5.3	16.0	252.0	943	1,300	37.9
Dry vegetables	74.0	74.0	0.0	1,000	1,100	10.0
Sesame	10.5	11.0	4.3	410	500	22.0
Tobacco	2.1	2.8	10.0	1,100	1,300	18.0
Vegetables	29.0	32.0	10.0	10,000	13,000	30.0
Potatoes	10.0	12.0	20.0	12,000	15,000	20.0
Fodder	3.8	4.5	18.4	35,000	40,000	14.3
Dates	10.0	11.0	10.0	--	--	--
Coffee	8.0	9.0	12.0	3.8	4.6	21.0
Grapes	14.5	17.0	17.2	--	--	--
Others	12.5	15.0	20.0	--	--	--
TOTAL	1,004.5	1,024.4	2.0			

Table IV.5  
 PROPOSED LAND AND WATER RESOURCE DEVELOPMENT PROJECTS  
 SECOND FIVE-YEAR PLAN  
 (In YRls 1,000)

	Expenditures to Dec. 31, 1981	Planned Expenditures 1982-86	Total Estimated Cost
<u>Ongoing Development Projects</u>			
Wadi Zabid - TDA	148,278	19,674	167,952
Wadi Rima - TDA	37,830	187,478	225,308
Wadi Mawr - TDA	500	347,266	347,766
Wadi Sibam - TDA	4,451	40,655	45,106 <sup>1/</sup>
Wadi Rasdan - TDA	1,138	87,080	88,215
Sub-Total - TDA	192,197	682,153	874,350
Wadi Al-Jawf	36,750	178,000	214,750
Construction of Small Weirs	6,300	250,000	256,300
Groundwater Development	7,000	90,000	97,000
Wadi Bana	2,600	35,000	37,600
Sub-total	52,650	553,000	605,650
Total Ongoing Projects	244,847	1,235,153	1,480,000
<u>Proposed New Development Projects</u>			
Marib Dam	--	300,000	300,000
Wadi La'a Irrigation	--	220,000	220,000
Sub-total	--	520,000	520,000
<u>Water Assessment Projects</u>			
Agromet Stations	250	5,000	5,250
Water Resources Survey	--	40,000	40,000
Studies of New Irrigation Methods	--	3,000	3,000
Sanaa Basin Study	--	32,000	32,000
Study of Reuse of Sewage Water	--	1,000	1,000
Sub-total	250	81,000	81,250
<u>Related Land Projects</u>			
Registration of Land Ownership	--	5,000	5,000
Land Classification	--	8,000	8,000
Maintenance of Terraces	2,600	14,000	16,600
Sub-total	2,600	27,000	29,600
Grand Total	247,697	1,863,153	2,110,850

<sup>1/</sup> An additional expenditure of approximately YRls 120 million would be required after Second Five-Year Plan.

Source: From Directorate of Irrigation, Minister of Agriculture and Tihama Development Authority

### Agricultural Marketing

The SFYP includes a number of components with regard to marketing of agricultural products. New market centers are planned for five urban areas including cold storage facilities. Several market studies are planned on various commodities as well as a national company to assist in expatriate market development and assist internally. The Plan calls for a move towards legislation to establish quantity and quality standards for food products. Agricultural marketing cooperatives are to be encouraged.

### Manpower Development

As of October 1981, the YARG estimated the number of personnel needed for major agricultural development projects already in the pipeline to be 47 engineers, 22 surveyors, 249 B. S. level agriculturalists, and 773 technicians. If those sent abroad in the 1970's were to return and work in the Ministry, the B.S. level needs would be satisfied. However, only 38 are presently employed. The prospect for the nearly 800 technicians needed is even bleaker.

The SFYP addresses the problem and outlines a needed number for each agricultural speciality. It includes 75 engineers, 66 of which are civil and 9 are mechanical. In the agricultural disciplines, 494 are outlined with nearly half listed as general agriculture. The Plan calls for 757 agricultural technicians and 1,427 skilled workers in support roles. Seventy one expatriate experts are listed with a total input of 4,371 man months of time.

### Other Major Components

The Plan addresses the needs in the areas of agricultural research, and agricultural extension although they are not detailed here. The Ministry plans a building construction program outside Sanaa for governate offices. The 1980/81 agricultural census is to be completed for additional areas of the country. The Plan calls for cooperation with the CPO in planning efforts and strengthening of the planning and statistics division of the Ministry. The development of a Documentation Center is included.

#### I.V. 2 Assumptions

By far the most important assumption made in making recommendations regarding agricultural development projects, programs, and policies for the YAR is that the economy is and will continue to be a capitalistic oriented, free enterprise economy.

The YARC prefers to play a catalytic role in agriculture; one void of interference with free market forces to the greatest extent possible. Unlike a number of other less developed nations, unequal income distributions between the rural and urban population is not a serious problem. As a result, the goal of economic justice is well served by an open competitive economy.

There is ample evidence that the Yemenis in general, and Yemeni farmers in particular, are economically rational and make their production decisions with relative profitabilities in mind. Further, there are no cultural limitations in the adoption of new technology. Like any formally educated farmer in the developed economics, however, the rate of adoption of a new technology is directly related to an understanding of the technology and proof of its profitability.

Another assumption made is that opportunities for Yemeni men to work abroad will decline in the future. There are several economic factors relevant to the labor market in the Middle East which tend to reduce the number of Yemeni workers demanded. Contracts in the neighboring Gulf States are being currently let to the private sector with monitoring by the governments. In order to minimize administrative problems, the contracts are large and include the responsibility for every phase including financing, design, and construction as well as the subsequent manning of the enterprise. There are few local companies capable of handling these efforts.

Labor costs are a major item in determining the lowest cost bidder or most efficient contractor. The advantage has been flowing to the Indian subcontinent and Far East companies because their labor is cheaper, they have proved capable of mustering highly efficient work forces, and generally, are meeting project deadlines. The result is that Arab migrant workers are less heavily involved in the larger-scale components of Middle Eastern development.

A third development is the tendency to subcontract public sector development projects. Telecommunications, electricity provision, water distillation, roads, hospitals, and other public services may be contracted to firms using lower cost Filipino, Pakistani, or Korean staff.

In general, capital is relatively plentiful in most of the Middle Eastern oil countries while labor is scarce and expensive. Capital intensive technology is replacing much of the demand for high cost labor. These factors would seem to

available in Yemen and to the agricultural sector. The existing high price for agricultural labor would be pressured downward -- a result that would lower production costs for farmers and thus improve the profitability of crops particularly those that are more labor intensive. For the economy as a whole, the reduced remittances associated with less Yemenis working abroad would have a negative impact as a consumer demand levels would fall as incomes fall. However, the demand for food commodities is more price inelastic as compared to nonfood items which lessens the negative impact on agriculture as a whole.

Such a reduction in the demand for Yemeni emigrant workers would tend to reverse the effects reported in the World Bank Agricultural Sector Memorandum of June 26, 1979 which included:

1. The reduction in area planted with low value crops (mainly cereals), a reduction of food grain output, and abandonment of marginal land;
2. Intensification of land use, where water resources are available to substitute high value for low value crops;
3. The drive towards partial mechanization of production, mainly plowing;
4. Initiatives by some landowners to alter crop sharing arrangements in order to retain tenants, and
5. Greater use of women and children in farm labor than in the past, particularly in planting, weeding, harvesting, winnowing, applying manure, and tending livestock.

In sum, the expected reduction in employment opportunities for Yemenis outside the country will have a doubly favorable impact for Yemeni farmers. First, labor costs should decline and second, the terms of trade for Yemeni producers of internationally traded agricultural commodities should improve. For the economy as a whole, however, the impact would be more negative than positive.

The agricultural sector is also affected by some of the more subtle but complex effects of emigration such as changes in consumer taste patterns resulting in changing demands for agricultural commodities, problems -- associated with increased urbanization, and problems of family fragmentation. The World Bank Report, Manpower Development in the Yemen Arab Republic, March 27, 1981, concluded that in the short run, the net effect has probably been positive, but that policy measures will be needed to rectify some of the more adverse consequences that will become increasingly apparent over time.

### 11.3. CONSTRAINTS AND LIMITATIONS TO DEVELOPMENT

In planning agricultural development projects, programs, and policies for the second five year plan, the YARG faces a set of physical, economic, and institutional constraints that necessarily restrict production and income below that which is desirable. Some of these constraints restrict production and income during the period of the SFYP and some constrain production potential one or two decades hence. The choice of maximizing production and income potential in the short run is politically expedient and socially demanded, however, responsible planning requires a long run view as well.

#### Physical and Technical Constraints

Water is perhaps the most important resource constraining agricultural production in the YAR. While water, from natural rainfall is often adequate for a cereal grain crop in the uplands areas, it is not dependable on a year-to-year basis. Furthermore, it is usually bimodal in distribution which restricts crop growth in the middle of the crop season.

Groundwater is available and the most widely held belief is that recent large increases in the number of wells for withdrawing water has resulted in a drop in the water table accompanied by increases in salinity. The sources of underground water are not well mapped as to where there are only closed aquifers and where underground supplies are recharged. Without a better understanding of underground water supplies and the technical and legal capacity to monitor and regulate their use, this constraint will become more intensified and restricting as time passes.

The control and more efficient use of surface water is equally as important. Current water rights allow up-wadi farmers to pull off as much water as they wish which reduces the amount available for farmers further down the wadi. The result is a wastage of water up-wadi and fewer acres cultivated down-wadi. The YAR cannot afford such an inefficient use of its water resource.

Dams, diversion structures, etc. are all important components of a water resources development program. All need to be integrated into a comprehensive and integrated program or the constraint of the water resource will not allow advances in agricultural production in the YAR either in a short or long run time frame.

Closely allied and complementary to water resources are soil resources. The vast majority of the YAR is rangeland — some 14 million hectares. Only

100 million trees of land area in reforestation program of 100 million planted each year. The condition of the rangeland is important to the success of water resource development projects. Unstable rangeland will erode causing silting problems that will auger against the success of dam and irrigation schemes. Unstable rangelands in the YAR are commonly thought to have resulted from unwise grazing practices by livestock owners. One view is that the low productivity of crop agriculture in the YAR is widely the result of a deterioration in the basic soil resource. Land use planning policies are in order to protect longer new production potential.

### Economic Constraints

Both macro and micro economic factors will constrain the growth of agricultural output during the SFYP unless extraordinary decisions are made by the YARG to prevent it.

During the 1970's, the economy prospered primarily because of ever larger remittances from emigrant Yemeni workers in Middle East oil producing states. From 1970-78, the YARG found revenues rising faster than expenditures and a foreign exchange reserve that rose to a peak of \$1.6 billion.

In the FFYP (1976/77 - 1981/82) the planned growth rate of real GDP for agriculture was 5.5 percent at a compounded annual rate. To date, the real growth has been nearer 1.0 percent. One major reason is the lack of commitment to agriculture that was pronounced at the beginning of the FFYP. In the first four years of the FFYP, the agricultural sector has realized only 46 percent of the fixed investment planned for it while the total economy realized 84 percent. Likewise, agriculture received only about two percent of the government capital expenditures during this period.

Another indicator of lack of commitment to the agricultural sector by the YARG is the expenditure from current budget. In 1976-77, agriculture received 4.0 million YR. While the amount more than quadrupled to 16.7 million YR by 1979-80, it still represented less than one percent of government current expenditures. The important point is, that during most of the 1970's when the economy prospered and the government was experiencing surpluses, the public sector took little responsibility for agriculture's growth and well being. Now, as the SFYP is being drafted, the government finds itself in a weaker position.

The YAR economy began weakening in 1979. The YARG's net surplus position became negative for the first time in 1979-80. Remittances leveled out and actually declined in real terms. The conflict between the two Yemen's in 1979 resulted in an outflow of private funds for safer investment as well as

higher returns offered in financial markets abroad. While foreign aid receipts have increased substantially in the last three years, the YARG's current account went into deficit in 1979-80 for the first time as did the overall balance of payments. With remittances predicted to continue to decline and the Yemenis now accustomed to a large variety of imported consumer goods (including food) whose value has risen about four times in the past five years, the future prospect of the public sector assisting agricultural development is bleaker than ever. This becomes the bottom line on the macro economic constraint to agricultural development. Furthermore, declining remittances constrain the ability of the private sector to fuel investment in agriculture.

During the 1970's micro economic factors slowed down growth in most of the commodity subsectors in agriculture. The economic forces that fueled the general economy impacted negatively on farmers' cost of production largely through rapid increases in the farm labor wage rate. While some of the commodity subsectors made rapid strides in output growth (qat, broilers, grapes, potatoes, tomatoes), most, including all the cereal grains, lagged behind. Furthermore, the gains in the broiler subsector, for example, went to a few very large commercial growers rather than being widely distributed among the rural population.

For the cereal grains which are at the very heart of the subsistence economy in the YAR, the price of imported grains remain lower than the domestic cost of production. As a result, the farmers incentive to produce sorghum, millet, or corn remains a subsistence effort to provide some food for their families and fodder for their livestock. Cost and return budget estimates estimate the farmers' return per day of labor input in the production of cereal grains to be less than the current wage rate for agricultural labor and far below the return in vegetables, fruits and qat. While the shift from the lower return grain crops to the higher value crops favorably impacts on the GDP generated in the agricultural sector, the situation does not help a large number of farmers and forces the YARG to rely heavily on imports of grains both for human consumption and for animal consumption (e.g., all poultry feeds used by commercial growers are imported). The bottom line as to the micro economic forces is that producer incentives based on favorable cost/return relationships for many agricultural commodities (most notably the grain crops) is lacking. This is expected to persist into the future unless the YARG adopts stronger policies to assist them in the past. One favorable factor, however, at the micro farm level, is that labor wage rates will fall as the opportunities for Yemenis to work abroad declines (see previous section IV. 2). Lower costs of production that would result will be a positive force to producers incentives.

continue to constrain agricultural development in the YAR. The slowdown in the overall economy that is now occurring and will likely continue is reflected in lower remittances, per capita incomes, and thus a slowdown in consumer demand for all goods and services. As a result of the slowdown, the YARG will have less income from duties that now comprise the largest share of government receipts. Unless the YARG changes its policies or improves its ability to extract taxes on remittances and domestically produced income, the situation will worsen and preclude public support to the development of any and all sectors of the economy including agriculture.

### Institutional Constraints

The principal factor constraining the ability of public sector institutions to assist agricultural development is the lack of trained people. The MAF and the regional agricultural development authorities have a budget and low salary structure (relative to the private sector) that limits their ability to attract, train, and retain personnel. While outside donors have tripled assistance in the last three years, the lack of counterparts to work with expatriates limits the rate of progress in developing MAF as a strong motivational force assisting agriculture development. The institutional constraint is most evident in the lack of extension agents to assist farmers in the adoption of new technology. Except in the Tihama and Southern Uplands regional development authorities, the impact of extension education to farmers is virtually nil. Furthermore, the low level of education of the extension agents that are working constrain significantly their ability to influence agricultural production through farmer education.

The public sector institutions will remain poor as long as the central government's ability to collect tax revenues from private sector remittances and other incomes remains weak. And the positive effects hoped for by influxes of funds from outside donor agencies will be stifled (particularly for the longer run) as long as public sector institutions remain immature and weak. Institutionalizing a capacity to service and assist agricultural development within the MAF, for example, is the primary goal of USAID assistance. This process is slowed and development efforts are thwarted as long as the YARG is financially weak and personnel for training and employment are few in number.

Social Constraints

Social constraints are fewer in number and generally are probably less constraining than physical economic; or institutional factor. Nevertheless, they are worthy of mention. Of particular note is the fact that women play a major role in agricultural production and marketing of food. Yet, the Yemeni culture is such that most development projects are oriented to men-- particularly training programs. To the extent that agricultural production processes are managed by women, it is important that extension education programs are designed to reach women as well as men.

#### IV. 4. Factors to Consider in Planning Projects, Programs, and Policies For Agricultural Development

The planning process for promoting agricultural development is complicated by many factors. All projects and programs compete for the same financial resources available from government allocations. The social welfare is better served if scarce resources are allocated in as efficient a manner as possible. Such an allocation requires a knowledge based planning effort that is cognizant of YARG goals and objectives to be achieved, the constraints inherent in the YAR (IV. 3), and the following factors.

##### General Considerations

For any project, program or policy to be successful, it must have four attributes. First, it must be socially acceptable. In the YAR, this will require it being accepted by the sheiks in the villages. Without a strong central government capable of imposing its will in rural areas, acceptance by the local tribal leaders is a necessary prerequisite.

The second requisite is that of being economically rational. This is of particular importance in the YAR where a competitive private enterprise economy exists. To the extent that projects and programs are economically rational, resource use is more efficient and additional private enterprise resources can be marshaled for agricultural development.

Third is political acceptability. In the YAR, this would seem to not be a great obstacle as long as village sheiks are consulted and utilized to support the various projects and programs.

Lastly is the factor of administrative feasibility. In the YAR, this may be the most difficult of the four. Institutional constraints were discussed in IV.3. A weak and undermanned MAF which is already stressed may not have the capability to administer a program regardless of its potential to serve the goals of agricultural development.

##### Time Considerations

Development projects, programs, and policies impact on goals and objectives at various times in the future. A fertilizer distribution program may achieve increases in per hectare yields and hence total production in one year or less while an integrated program of wadi development may require

allocating scarce resources among projects requires a judgment decision by policy-makers that weighs near by with long range social benefits. In most less developed nations, shorter term benefits usually receive greater consideration.

#### Impact Incidence Among Farmers

The YARG makes explicit recognition of assisting subsistence, small scale farmers in the goals and objectives of the SFYP. In the Yemeni economy, larger scale commercial farmers are in less need of development assistance. The important point is that programs designed to assist largely subsistence low income farmers do not, at least in the short run, make a large impact on the goal of increasing total production.

#### Commodity Emphasis Consideration

When considering programs that relate to increasing the production of a specific commodity, e.g., a wheat vs corn improvement program or a policy that impacts on a particular commodity, e.g., and increased import duty on eggs, it is necessary to consider the price and income elasticities of demand and the price elasticity of supply for the commodities in question. This is even more true in an economy like the YAR where supply and demand factors effectively allocate factor inputs into production and finished goods into consumption.

While a formal research project would be required to estimate the various elasticity coefficients, a judgment analysis based on production, income, and consumption estimates can be made.

The following example in the YAR context is illustrative. Take the two grain crops of sorghum and corn. Both provide a grain for human consumption and fodder for livestock consumption. Given a fixed amount of resources available for an improvement program, how might they be allocated between the two. Data available indicates that the area planted to corn has increased in recent years relative to sorghum. Incomes generally rose during the 1970's and crude consumption data suggests corn is preferred by consumers over sorghum. It can be hypothesized with some confidence that corn has a higher income elasticity of demand than sorghum, i.e., with a one percent increase in consumer income, the percentage rise in corn consumption will be greater than the percentage rise in sorghum consumption. When an income elasticity coefficient is high, it can be generally concluded that the price elasticity of demand coefficient is also high (more elastic). As a result, lower prices will be required to move larger quantities into consumption. This is a socially-desirable long run result. In the short run, relative greater

increases in the demand for corn over sorghum will hold corn prices relatively higher giving producers more incentive to produce. The point to be made is that, given a choice, the public sector serves society better in the long run, by giving assistance to the crop with the higher elasticity coefficients; in this case corn. The conclusion assumes other factors are equal. In this case, one of the other factors is that the fodder value from the two crops is about the same.

#### Essential Ingredients for Agricultural Development

The widely accepted Mosher paradigm of essential and accelerating ingredients for agricultural development to move ahead is useful in the YAR context. Given the basic goals of increased production and its accompanying commercialization in the agricultural commodity subsectors, the Mosher model includes five essential ingredients: markets, local availability of agricultural inputs, transportation, a changing technology, and producer incentives. These, of course, are interrelated. An additional set of five ingredients is listed as accelerators to the agricultural development process; namely, farmer education, production credit, expanding and improving the land base, national planning for agricultural development, and group action by farmers.

Most of these ingredients are reflected in the FFYP and the SFYP. They are repeated here to reemphasize their importance. In the YAR, the most serious limitations are in the area of producer incentives and developing marketing infrastructure.

#### IV. 5. Existing Projects, Programs, and Policies

As the SFYP is being drafted, it is useful to review the basic objectives of the FFYP and the general strategy of YARG in meeting those objectives. Quoting from the FFYP, the basic objectives for the agricultural sector included:

1. Following the path of self-sufficiency in alimentary agricultural products within economic limits, taking into consideration population increase and raising dietary standard of the people.
2. Ensuring the requirements of existing and newly constructed industrial projects for agricultural raw materials.
3. Reducing the balance of trade deficit in agricultural products by reducing the size of imports and increasing the number and size of exports for the most important agricultural products.
4. Improving the quality of agricultural products and increasing their strains.
5. Spreading vegetation throughout the country, especially fruit trees, woodland and meadows.
6. Supporting the small producer materially, and seeing that justice and settlement in agricultural relations are realised.

The general strategy of meeting these objectives included:

1. Continuing the construction of leading and executive agricultural institutions through intensified programmes for training and qualifying required agricultural manpower.
2. Completing studies, and enlarging the application of comprehensive rural development principles in order to cover the Yemeni countryside.
3. Carrying out a comprehensive survey for soil and for water resources, surface and underground water, in order to organize their exploitation, and their preserve, on economic and scientific basis, which will make for the increase of total irrigated area, and speeding the execution of irrigation projects as soon as the feasibility and technical studies of these projects are finished.
4. Combining agricultural research with the requirement of agricultural development, where such research would have an applied nature enabling to reach determined results in the shortest possible period, and to deal mainly with the factors limiting the production in various areas; and introducing new crop required by the Yemeni economy; and arriving at the suitable and intensified rotations.
5. Providing justice and stability in relations between owners and workers in agriculture, and developing formula for agricultural co-operative

organizations compatible with the circumstances of the Yemeni countryside, especially, in the fields of borrowing, marketing and ownership of agricultural machinery.

6. Developing agricultural extension in various spheres and enlarging it.

7. Improving the yield per hectare, improving the quality of production, varying agricultural crops, reaching accelerated rate of growth in the field of afforestation and fruit trees, and checking the expansion of Qat Trees. Drawing clear policies for developing the productivity of main crops which are characterised by great economic importance and, powerful effect on the dietary standard and the balance of trade.

8. Realising quick development in animal husbandry production, and fishing wealth through the expansion of veterinary care, providing fodders, improving stock, starting the exploitation of fishing wealth on an economic abasis and, improving old time fishing technique.

9. Constructing roads and transportation capacity necessary for moving agricultural crops.

10. Providing the storing capacity for crops in order to meet out-of season demand for grains and fodders, and to face drought years.

11. Putting a plan for agricultural credit where it can serve the government policy of developing agricultural and animal production, supporting agricultural co-operation, revising the rate of interest on agricultural loans, and spreading agricultural credit bank services to cover Yemeni agricultural areas gradually.

12. Carrying out studies on prices, marketing and taxes, and shaping proper policies to serve the aims of developing agricultural production, attaining social justice and checking the drain of migration from the countryside into towns and outside the Republic.

13. Speeding the execution of agricultural census, training the necessary statisticians, taking benefit of the new methods for developing statistical technique and forecasting, in order to help taking economics on a sound basis.

14. Taking into consideration agricultural development plans in neighbouring countries and coordinating planning, trade inter-relations, specialisation of products and the problems of boundary areas in connection with production and marketing.

The specifics of the plan included the launching of 42 projects under eight classifications as follows:

1. Plant Production (14 projects)

Introduction of hybrid seeds, development of coffee production, improvement of sorghum and millet, increase of potato cultivation, improvement of tropical fruits, fruit tree nurseries, plant protection, forest nurseries, desert locust control; agricultural development, agricultural

extension, central agricultural research center, Dhamar agricultural development center, and El Batna development center.

2. Rural Development Projects ( 6 projects)  
Southern Uplands, Rada, Al Boun, Khowlan, Hajjah, and Al Mahweet.
3. Meat Production Projects ( 4 projects)  
Poultry production, poultry training, veterinary services, livestock processing and credit.
4. Land and Water Resources Projects (5 projects)  
Wadi Al-Jawf Development, construction of small dams, terrace maintenance, underground water development, and agricultural meteorology
5. Fisheries (7 projects)  
Fisheries planning and surveys
6. Support to Ministry of Agriculture (2 projects)  
Advisory support team, agricultural statistics.
7. Agricultural Mechanization (1 project)  
UK Taiz Center
8. Tihama Development (3 projects)

In the FFYP, the estimated project cost for the 42 projects was 1,392,294,000 YR. As of December 31, 1981, total expenditures has amounted to only 65 percent of that estimated or 928,239,000 YR. Expenditures for the land and water resources projects and for the Tihama development projects had been 150 percent of that planned while in the fisheries area, only six percent of that planned had been expended. Three of the rural development projects (Khowlan, Hajjah, and Al-Mahweet) had received virtually no support. Thus, there was wide variation in funds use among the projects planned. Of the funds actually expended by the end of 1981, a percentage breakdown would be as follows:

	Percent
Meat Production Projects	22
Tihama Development	21
Rural Development Projects	19
Land and Water Resources	17
Plant Production Projects	15
Ministry of Agriculture Support	4
Agricultural Mechanization	1
Fisheries	1
Total	100

This summary gives some notion of the priorities assigned to development projects in agriculture by the YARG in the first four years of the plan.

Various degrees of success resulted from projects implemented under the FFYP. The following summary highlights some of the more important.

#### Crops

In the crop subsectors, the planned output targets were not achieved except for fruits, including grapes. Increase were planned for all crop subsectors, but absolute decreases were experienced for sorghum, millet, barley, and cotton (Table IV.6).

Table IV. 6.

Planned and Achieved Crop Production Increases for the Yemen Arab Republic Under the First Five Year Plan.

Crop	Base Year (1975/76)	Fifth Year 1980/81		Percentage Increase	
		Planned	Achieved	Planned	Achieved
		1,000 tons		Percent	
Sorghum and millet	785	1,042	646	+ 32.7	-17.7
Maize	35	110	49	+214.3	+40.0
Wheat	62	128	65	+106.5	+ 4.8
Barley	58	83	48	+ 43.1	-17.2
All cereals	940	1,363	808	+ 45.0	-14.0
Pulses	76	105	84	+ 38.2	+10.5
Vegetables	193	705	261	+285.2	+42.6
Potatoes	76	306	131	+373.7	+72.4
Fruits, including grapes	107	142	144	+ 32.7	+34.6
Coffee	3.4	4	3.6	+ 17.6	+ 5.9
Cotton	13.5	32	5.0	+137.0	-63.0
Tobacco	5.6	8	7.0	+ 42.9	+25.0
Sesame	5.5	11	6.0	+100.0	+ 9.1
All crop production YR <u>1/</u>	1,662	N.A.	1,813	N.A.	= 9.1

1/ In YR1s million at constant 1975/76 producer prices from CPO National Accounts Data.

Source: First Five-Year Plan Document and Ministry of Agriculture.

### Livestock and Poultry

The specific objectives related to moving towards self sufficiency in animal products was to be reached through increasing the stock of cattle, sheep, goats, and poultry and by increasing the productivity of the animals. This would serve the goal of increased incomes for animal producers by reducing the cost of production and organized marketing.

The Livestock Processing and Credit Project of the FFYP would be considered a success. Production was stimulated largely through an improved marketing system and the construction of slaughterhouses. This project was complemented by the successful Veterinary Services Project which operates three programs: (1) a livestock training center in which 65 Veterinary Assistants were trained and which now graduates 20 persons a year, (2) veterinary subcenters where farmers can get treatment for their animals, and (3) a diagnostic laboratory in Sanaa. Both of these efforts are to continue in the SFYP.

### Manpower Development

The lack of trained persons is well accepted as a key constraint to promoting agricultural development in the YAR. With World Bank and USAID assistance, three secondary schools are being established; (1) the Ibb Agricultural Secondary School (opened September 1979), (2) Surdud Agricultural Secondary School (to open September 1981), and (3) the Sanaa Livestock Secondary School (construction scheduled for completion March/April 1982). The Ibb School has a designed capacity for 270 students, i.e., 90 students entering each year for a three year course of study. Actual enrollment was 55 the first year and 23 the second year -- considerably short of expectations but a major step towards assisting the manpower needs of agriculture.

In-service training within the MAF under the FFYP has been largely unsuccessful. The identifying of counterparts for the donor assisted technical assistance projects in agriculture has been slow. Specialized on-the-job training of technical level personnel on three separate projects has achieved better results. These include the Wadi Zabid Extension Agent training, the Central Agricultural Research Center Training of extension agents to serve on the Southern Uplands Development project and the UK Veterinary Services Project.

During the FFYP, the YARG did an admirable job of identifying and sending candidates for university degree training abroad. For the seven years 1974/75 through 1980/81, a total of 748 students were sent abroad -- most for the four year B.S. degrees. By October 1981, 338 should have returned. However, only 30

returning graduates have joined the MAF in the past five years. The basic problem stems from low salary and benefits relative to other branches of the YARG and private industry. Unless this problem is directly addressed, it will persist and continue to constrain manpower development and hence agricultural development.

The record for short term training is one falling way below target. Of a total of 2,157 man-months available for short term training abroad, only 873 (40 percent) were actually implemented. The basic reason was due to the shortage of Yemeni staff qualified to benefit.

### Agricultural Extension

Excepting the extension components of the Southern Uplands and the Tihama Development Authority projects, the progress in reaching farmers during the FFYP was virtually nil. The initiation of extension services was a cornerstone in the FFYP by the YARG to develop the agricultural sector. However, only three extension centers out of a planned 44 were established. Constraints include the lack of facilities, the lack of budgetary support, and the low remuneration for extension staff. On the last point, over half of the agents initially recruited on the SURDP have left the service. At Taiz and Zabid, of 249 students given pre-service training, only 131 were still on the job as of August 1981.

### Agricultural Research

Agricultural research in Yemen was assisted from 1970-78 by an FAO-UNDP program. A second phase executed by the World Bank as part of a UNDP Project extends assistance through 1982. A Central Agricultural Research Station (CARS) was established at Taiz to (1) conduct a research program geared toward the agricultural problems of the Southern Uplands; (2) advise the MAF on a national research program, (3) provide facilities, equipment, and expatriate assistance for a study of the country's various research programs, and (4) provide for training of the necessary extension agents under the regional rural development projects.

Agricultural research progress in the YAR is constrained by the lack of Yemeni counterparts, lack of suitable farms or facilities, inadequate operating funds, and absence of research coordination. However, during the FFYP, improved agronomic practices were tested and made available to farmers; additionally, there were releases of some new high-yielding varieties of wheat, maize, sorghum, cotton, and several vegetables.

### Water Resources Development

The FFYP included 11 major wadi development projects. Additionally, water resource investigation projects, construction of small dams, and well drilling were contained. The completion records shows the major works finished on one wadi and works started on three more. There was very little activity on small dam construction. Of 100 diversion weirs on wadis, only 11 were completed. A major well drilling project was completed in Wadi Mawr but most of the well digging was carried out by the private sector. Of the two water assessment projects commenced with outside donor assistance, neither progressed satisfactorily according to the donors. The relatively low success record on water resource development projects in the FFYP was in spite of significant cost overruns on some projects. Clearly, the SFYP must address this important area in a more organized and thorough manner.

### Other Project Areas

Other spheres included in the FFYP included plant protection, maintenance of terraces and walls, fertilization, agricultural mechanization, fodders, and fisheries. The German assisted Plant Protection Center (Shoub Farm), is making progress in conducting plant protection research trials and preparation for farmer demonstrations in plant protection. Until a national extension service is established, the Center's goal cannot be fully reached. The other project areas achieved limited successes in the FFYP and are addressed further in the SFYP.

### Role of Donor Agencies

Outside donor assistance to agricultural development in Yemen has tripled in recent years provided by the United Nation's Development Program, the World Bank, and a number of nations including the Netherlands, United States, West Germany, the United Kingdom, and Saudi Arabia. About two thirds of the budgeted funding for the agricultural development projects outlined by YARG in the FFYP were provided by outside donors. These donors, for the most part, are planning to continue assistance for the forthcoming SFYP. To reach the goals and objectives of the SFYP will necessitate close working relationships between the YARG and the donors. During the FFYP, some project goals were thwarted by the YARG's inability to commit planned funds or provide trainees and counterparts as agreed to in donor assistance contracts. Donors, on the otherhand, can make greater efforts to integrate their assistance within the institutions and culture of the YAR.

#### IV. 6. Analysis of Projects, Programs, and Policies

The analytical method used here is one of building and impact matrix that relates projects, programs, and policies (means) to goals and objectives (ends). The analyses is qualitative in nature relying heavily on judgment.

Manpower development and the development of agricultural institutions are summarized in the first table matrix (Table IV. 7). Programs and policies for land and water resources, marketing, agricultural inputs and price, income, and trade policies are presented in additional table matrices (Table IV. 8).

##### Manpower and Institutional Development

Institutional development is a necessary requisite for developing the agriculture of the YAR. The major institution is a government ministry to plan, administer, coordinate, and implement projects, programs, and policies relating to agriculture. Others include agricultural research, extension, education, and credit. Institutions are only as strong as their personnel and budget. If an institution is to develop successfully, it must be simultaneously accompanied by a manpower development plan. And a manpower development plan as a personnel input delivery system to the institution cannot succeed without an incentive system to adequately reward those employed in the institution.

The tripartite institutional foundation of agricultural education, extension and research is commonly accepted as the basis for serving the agricultural economy. All require simultaneous effort and funds allocation decisions among them are most difficult. Since the results of agricultural research can be more easily "imported" in the form of agricultural inputs and expatriates can carry on adaptive type research, the research institutions initially need less relative emphasis than extension and education. For education at levels beyond high school, students can be sent abroad. In this regard, the FFYP was correct in emphasizing vocational-technical schools at the secondary level rather than immediately launching into a university development program. The development of agricultural extension services deserve a high priority from the beginning. Because of language and culture, it is impossible for expatriates to assist as agents to farmers.

##### Agricultural Extension

The objectives included in the matrix (Table IV. 7) for agricultural

TABLE IV. 7.

Impact Matrix Relating Projects, Programs, and Policies to Goals and Objectives for Agricultural Institutions

Projects, Programs, Policies

Goals and Objectives

	Agricultural Research			Develop	Develop
	Research Output	Trained Researchers	Retain Research Staff	MAF as Institution	Agricultural Credit
Establish national research authority - MAF	.			+	
Establish regional research stations	.				
Emphasize basic research	+				
Emphasize applied research	+				
Initiate farming systems research approach	+				
Establish national extension service				+	
Establish extension offices in each governate					
Adopt training and visit extension methods					
Conduct on farm demonstrations					
Broadcast information to farmers by radio					
Develop information tapes w/cassette players					
Extension training schools - Zabid, Surdud					
In service training for extension agents					
Send students abroad for training		+			
VoAg Technical Schools - Ibb					
Livestock training school - Sanaa					
Inservice training for research technicians		+	+		
Implement trainee recruitment program					
Adopt system for salary supplements					
Write job descriptions for all positions					
Provide housing for field employees					
Adopt incentives for educational upgrading					
Waive military service for returning grads		+	+		
Strengthen agricultural statistics unit	+				
Conduct national agricultural census	+				
Provide marketing and price information	+				
Develop area sampling frame of farmers	+				
National planning for agricultural development	+				
Establish Documentation Center in the MAF					
Establish Faculty of Agriculture at Sanaa U	.				
Provide capital stock funding for Ag. Credit Bank					

+Direct impact

.Indirect impact

TABLE IV. 7 (cont.)

Impact Matrix Relating Projects, Programs, and Policies to Goals and Objectives for Agricultural Institutions

Projects, Programs, Policies

Goals and Objectives

	Agricultural Extension Service						
	Trained extension specialists	Increased farmer contacts	Develop extension information	Disseminate extension information	Trained extension agents	Upgrade extension workers	Retain extension personnel
Establish national research authority - MAF							
Establish regional research stations							
Emphasize basic research							
Emphasize applied research							
Initiate farming systems research approach		+	+	+			
Establish national extension service							
Establish extension offices in each governate		+		+			
Adopt training and visit extension methods		+	+	+			
Conduct on farm demonstrations		+		+			
Broadcast information to farmers by radio		+		+			
Develop information tapes w/cassette players		+	+	+			
Extension training schools - Zabid, Surdud					+	+	
In service training for extension agents			+	+		+	+
Send students abroad for training	+				+	+	
VoAg Technical Schools - Ibb					+	+	
Livestock training school - Sanaa					+	+	
Inservice training for research technicians					+		
Implement trainee recruitment program							
Adopt system for salary supplements							
Write job descriptions for all positions							
Provide housing for field employees							
Adopt incentives for educational upgrading					+		
Waive military service for returning grads.	+						
Strengthen agricultural statistics unit							
Conduct national agricultural census				+			
Provide marketing and price information							
Develop area sampling frame of farmers							
National planning for agricultural development				+			
Establish Documentation Center in the MAF							
Establish Faculty of Agriculture at Sanaa U							
Provide capital stock finding for Ag. Credit Bank	+						

+ Direct impact  
 . Indirect impact

extension include:

1. Trained extension agents
2. Trained extension specialists
3. Upgrading extension workers through in-service training - formal and informal.
4. Development of information packages for extension agents regarding the use of agricultural technology.
5. Disseminate extension information to farmers.
6. Increase the number of farmers contacted by extension agents.
7. Increase capability to retain extension personnel.

The impact points for these objectives from various projects, programs, and policies are illustrated in the matrix of Table IV.7. As would be expected, most impacts originate from programs related to agricultural extension and manpower development.

A difficult choice in the SFYP is whether to use the funds allocated to agricultural extension to extend service to a wider number of farmers in more governates or concentrate on fewer farmers in more depth. The FFYP concentrated on farmers in the Southern Uplands Rural Development and Tihama Development Authority areas. The YARG has sound political reasons for introducing extension services to more parts of the nation, yet to do so will reduce significantly the positive effects of a concentrated effort. Extension programs are successful only if the farmers contacted accept and get well acquainted with the agent. Ideally, for the YAR, an agent would be assigned to no more than 200 farmers. As of August 1981, only 135 agents were in service for the entire country.

The following recommendations are made regarding agricultural extension services.

1. Of highest priority is an agent recruitment, training, and retention program for both men and women. Its components include the operation of the extension training centers at capacity, an in-service training program tied to an incentive structure that specifies salary and benefits to be realized upon successful completion of an additional educational degree level or certificate program, and adoption of a uniform salary scale and supplements for agents.

The maintenance of a higher salary scale for extension workers in the regional development authorities will undermine the establishment of a nationwide extension service. It creates morale problems and tends to concentrate more talented and better trained agents into smaller areas.

2. A second priority program is the creation of extension educational materials for agents to use. Putting information on tape for playback with cassette type players operated by batteries would seem to be a way to reach farmers. Women, in particular, could gain information that could not be accessed through a male extension agent. Tapes could be passed among village farmers. Playing units could be supplied to groups not owning one. Radio -- broadcast programs are also recommended.

3. The creation of a national extension service is a worthy program and should be gradually pursued. It is recommended that efforts should be concentrated enough to assure acceptability and effectiveness to a target group of farmers. The training and visit methodology for extension education that has been successful in other developing economies should be given serious consideration.

In order to move towards the establishment of a national extension Service, the Extension Directorate in the Ministry must be strengthened with additional professional level officers to function as extension methods specialists, training officers, and information specialists. Also required will be the opening of an extension office in each of the governates with a cadre of professional personnel to backstop the field agents. Each of the provincial office specialists should have training in a particular discipline such as crop science. Each office would also need an extension methods specialist.

4. The effectiveness of extension agents is greatly enhanced by a cadre of specialists to backstop agent inquiries in technical specialty areas. The agent, in most cases, is a generalist and can never be expected to give farmers answers to every question. It is recommended that, to the extent personnel became available, that B.S. level graduates be sent abroad for graduate level training in the various agricultural disciplines, and in extension methods. Returning graduates should be exempted from military service and be under a firm commitment to give a designated service time to the Ministry.

5. For maximum effectiveness, agricultural research and extension personnel must work in harmony together. In the section to follow, a recommendation is made that a farming systems approach be utilized. Such an approach requires a team effort among researchers and agents at the farm level.

### Agricultural Research

In the matrix (Table IV. 7), three objectives are outlined for the agricultural research institution.

1. Increase research output of use in the YAR.
2. Increase the number of trained persons to work in research centers.
3. Increase capability to retain research center staff.

The two most difficult choices to be made by the YARG for the SFYP is first, whether to strengthen the Central Agricultural Research Station at Taiz or build additional ones, and second, what share of the research should be of the basic type and the applied type.

The following recommendations are made:

1. Assure that an administrative structure evolves that will coordinate agricultural research efforts for the whole country. Research is costly and duplicative efforts must be avoided. A national research coordinating organization is recommended for the Ministry.

2. Send trainees abroad for graduate level degrees to the degree suitable candidates are identified. Waive the obligatory military service for returning graduates and require a designated period of service to the Ministry.

3. Move slowly in building new research stations. Eventually, a research station is needed for each of the major agro-ecological zones but the CARS should be assured funds for successful operation before opening new stations.

4. It is strongly recommended that a farming systems research methodology be employed in designing and carrying out agricultural research. This rather new approach is being utilized in other developing economies precisely for the same reason it is recommended here; i.e., there is a dearth of information about Yemeni farmers. The approach begins with an in-depth inquiry at the farmer-household level. Then research projects are designed - many of which can be carried out on farmers' fields. The approach requires the cooperation of extension agents and the end results are information packages of more use to farmers. Such an effort could be mounted out of the CARS station at Taiz and service a wide area.

### Manpower Development and Agricultural Education

Manpower development as a integral part of insitutional development

Manpower development is defined here only in the context of agricultural institutions. The components include training institutions such as the Ibb Vocational Secondary School, in-service training, sending students abroad, and personnel policies that give adequate rewards with inherent incentive structures for persons to advance in the system. The matrix in Table IV.7 illustrates the importance of these components.

The recommendations with regard to agricultural education and manpower development are as follows:

1. Operate the vocational agriculture secondary schools and the extension training centers that now exist or are under construction to their fullest capacity. Delay opening new schools until the present ones are operating at capacity. Institute a uniform structure for student stipends and benefits (in concert with the Ministry of Education) for each level of trainees.

2. Identify and send abroad for training as many trainees as are suitable and bind them effectively to a contract that assures their return for service to the Ministry for some designated period of time. Waive the military service requirement for those successfully completing a B.S. or advanced degree abroad.

A further incentive for completing training and service to the Ministry might be that failure to complete their contract would automatically require them to complete military service.

3. Establish a uniform salary and benefits structure equivalent to or above (if possible) other ministries. Write job descriptions for each Ministry position. Give opportunities for salary advancement for merit, and additional educational programs completed. Consider a system for providing housing and transport to field employees. Support staff with adequate operational budgets. Transport for extension agents and supplies for researchers are examples. Other developing economies have experienced failure in extension and research efforts because only salary monies were budgeted.

4. In cooperation with the Ministry of Education, lay the groundwork for establishing a Faculty of Agriculture at Sanaa University.

#### Ministry of Agriculture

Implementing the program and policies already discussed under agricultural research, extension, education, and manpower development will effectively build the MAF into a stronger institution and thus a catalytic force in agricultural development. It is recommended that continuous attention be given to the organizational structure. A new project or program should not require a new department in the Ministry. This is a natural tendency

but one to be astutely avoided. Without attention to maintaining an efficient organizational structure, the organization will tend towards too many administrative positions, communications difficulties increase and programs become mired. Of present concern should be the operation of the regional development authorities. With their Directors reporting directly to the Minister and the programs under their authority involving the various areas under the Ministry, how can the Divisions build into functioning units? This is just one of several examples that are relevant to the current administrative organization in the MAF.

#### Agricultural Credit

The establishment of the Agricultural Credit Bank during the FFYP was a major accomplishment. It is recommended that its policies be turned to servicing the small scale farmer in addition to large scale farmers and the agribusiness industries. Its policy of sometimes taking equity positions in agribusinesses is questionable. Interest rates charged to all borrowers should reflect the actual cost of making the loan. The YARG should not need to budget for annual funds input to the Bank. The opening of additional branches will permit the Bank to reach more farmers.

The Bank's policy of providing loans in kind rather than cash significantly increases its cost of operation. At some point in time, even perhaps now, private sector businessmen will likely be able to distribute inputs at less cost. If the Bank is reluctant to loan cash to farmers, perhaps they could be given credit vouchers for agricultural inputs to present to businessmen. The businessmen could then redeem the money by presenting the vouchers to the Bank.

The Bank's policy of providing technical advice and assisting applicants in preparing feasibility studies for new agribusiness ventures is commended. That cost, however, must be covered by the interest cost charged.

#### Other Programs

There are several other programs that indirectly relate to the success of agricultural institutions. They are listed below and are thought to be of equal priority.

1. Strengthen agricultural statistics unit in the Division of Planning and Statistics, MAF.
2. Strengthen agricultural planning unit in the Division of Planning and Statistics, MAF.

3. Develop an area sampling frame and conduct a census of agriculture.
4. Establish a Documentation Center to service the professional staff needs in the MAF.
5. Provide marketing and price information to farmers and agribusinessmen on a regular basis.

#### Land and Water Resources

Programs and policies in land and water resources impact on all of the objectives listed under farming for all crop-subsectors and livestock subsectors excepting poultry. (see Table IV. 8). Likewise, they impact on the total agricultural sector and indirectly on the national economy.

Before discussing any specifics with regard to land and water resources, it is well to remember that over 80 percent of the cultivated land in the YAR receives water from natural rainfall. In a general sense, this would suggest that this water deserves more attention than does the development of ground water sources.

In the land and water resources area, it is critical that certain policies be implemented first if subsequent projects are to yield favorable results. A prime example is a program to dig wells. To the extent water is found and used by farmers, there is a short run positive impact on nearly all the objectives from crop yields through net farm income. However, if the well is drawing from an aquifer that is not being recharged, the benefits will become less and less as time passes and eventually turn negative. If the underground aquifer had been mapped prior to well drilling and a policy were in place regarding the use of groundwater, the water resource could have been managed for a much longer run period of benefits. Indiscriminate drilling of wells by the private sector without public law control is thought to be already causing serious problems in much of the country. Therefore, an indirect unfavorable impact is also listed in the matrix under the program of digging wells (Table IV. 8).

The soil resources are also important to the long run ability of the nation to provide increased amounts of food and fiber that will be required as the population grows and incomes rise. The vast rangelands are delicate and require careful management if the soil is conserved and forage feeds are to be available for livestock. Land policies are interrelated with water resources policy. The benefits from small dams are short lived if the soil is unstable in the catchment basin area. Erosion will occur and the dam will acquire ever greater quantities of silt. The result is a two fold loss.

In the FFYP, agricultural mechanization was included as one of the projects. With the existing high cost of labor, the substitution of capital for labor would appear to have merit. However, deep plowing of certain soils in the country would undoubtedly worsen the erosion rate. Once again, as with the digging of wells, a prior policy is needed in order for an action program to deliver benefits in both the short and long run.

In the land and water resources development area, the following recommendations are made:

1. Assess the nature of underground water resources prior to any well digging program.
2. Establish a regulatory agency to monitor the digging of wells and the withdrawal of ground water.
3. Change the water rights laws that permit up-wadi farmers to withdraw unlimited quantities of water. In the wadi development projects, and dam construction projects irrigation districts with a farmer owned governing organization should be created to develop water policies, make charges, collect revenues, and keep dam and other capital structures well maintained.
4. Survey the ground water and classify the soils in the cultivated areas first and then the adjacent rangelands in order to recommend prudent conservation policies.
5. Establish an organization for recording agricultural land ownership.
6. Continue major construction projects in integrated wadi development and water diversion weirs construction that are currently funded.
7. Assure that technical and economic feasibility studies precede the launching of additional dam construction and wadi development projects.
8. Continue efforts to rebuild and maintain terraces including a subsidy program.
9. Implement a policy to control livestock grazing on range lands.

#### Agricultural Inputs

The import and sale of improved seeds, fertilizers, pesticides, and machinery is presently handled by the private sector and the Agricultural Credit Bank. In the case of fertilizer, most is imported and distributed by the Bank. Demand for inputs will increase rapidly if other agricultural development projects and policies are successful in stimulating production.

It is recommended that the import and sale of inputs be left to the private sector. The government can assist by providing information on the estimated use of inputs by farmers and to regulate the use of pesticides for safety reasons.

TABLE IV. 5

Impact Matrix Relating Projects, Programs, and Policies to Goals and Objectives - Land and Water Resources

Agricultural

Goals, Objectives or Impact Incidence	Projects - Programs - Policies								
	Integrated wadi development	Small Dam Construction	Change water laws	Dig wells	Network for water use monitoring	Ground water management development	Subsidy for rebuild & maintain terraces	Control livestock grazing	Private merchant subsidies
AGRICULTURAL INPUTS									+
Availability									+
Use by farmers									
FARMING									
Crop yields	+	+	+	+ x	.	.	.	.	
Crop area planted	+	+	+	+ x	.	.	.	.	
Use of improved seeds	.	.	.	.	.	.	.	.	
Use of fertilizer	.	.	.	.	.	.	.	.	
Use of pesticides	.	.	.	.	.	.	.	.	
Livestock production	+	.	.	.	.	.	.	.	
production costs	+	+	.	+ x	.	.	.	.	
Farmer net income	+	+	.	+ x	.	.	.	.	
Quantity crops marketed	+	+	+	+ x	.	.	.	.	
Quantity livestock marketed	+	+	.	+ x	.	.	.	.	
Irrigation water available	+	.	+	+ x	+	+	.	+	
Soil resource conservation	+	.	+	.	.	.	.	.	
Soil cropping potential	+	+	.	+ x	+	+	.	.	
MARKETING, FOOD PROCESSING, FOOD DISTRIBUTION									
Infrastructure development									
Quantities moving in channel (domestic origin)									
Marketing costs									
Standards development									
Quantity									
Quality									
Market information									
Export market development									
AGRICULTURAL SECTOR									
Crops output	+	+	+	+ x	.	.	+	.	
Livestock output	+	+	+	+ x	.	.	.	.	
GDP from agriculture	+	+	+	+ x	.	.	+	.	
Soil resources conservation	+	+ x	+	.	.	.	+	+	
Water resource development	+	+	+	+ x	+	+	+	+	
Land area cultivated	+	+	+	+ x	.	.	.	.	
Crop yields	+	+	+	+ x	.	.	.	.	
Livestock yields	+	+	+	+ x	.	.	.	.	
Numbers of livestock	+	+	+	+ x	.	.	.	.	
Help small unit farmers	+	+	+	+ x	.	.	+	.	
NATIONAL ECONOMY									
Gross domestic product	.	.	.	. x	.	.	.	.	
Self sufficiency	.	.	.	. x	.	.	.	.	
Balance of payments	.	.	.	. x	.	.	.	.	

training of applicators may be given consideration. Input subsidies and other duty policies are discussed in the next section.

### Marketing

Except for government regulations on marketing margins that can be taken by importers, wholesalers, and retailers of imported foods, and a limited amount of participation in marketing of products by the Agricultural Credit Bank, the YARG has left the development of market infrastructure and the carrying on of market activities to the private sector. For the most part, this has been wise as the private sector has done an outstanding job of moving food to the consumer. Traditional periodic markets still service villages in rural areas and daily markets exist in the larger cities. The ability of the private sector to get a difficult marketing job done is illustrated with qat, a highly perishable product. However, there are a number of policies and programs that the public sector should consider to facilitate greater commercialization of grain crops, and reduce the marketing costs for industrial crops, fruits, vegetables, and livestock products (Table IV. 9). In that regard, the following recommendations are made:

1. Establish a capability in the Ministry to collect and disseminate price and marketing information data.
2. Begin study of a plan to establish a regulatory agency to move towards developing and enforcing quantity and quality standards for food products moving in marketing channels. A particular example is the need to establish the sale of broilers on a weight basis rather than unit basis.
3. Construct physical market facilities in town and cities for lease back at cost to businessmen selling food products.
4. Provide subsidized loans to private businessmen for the construction of agricultural processing plants and storage facilities.
5. Study thoroughly and move very slowly towards the establishment of any National Marketing Board type organization. In a basically free enterprise economy, such organizations are more than likely to stifle agricultural development for the longer run. They can, however, assist in export market development and implementation.

Projects Programs, and Policies

Goals, Objectives and Impact Incidences	Subsidize infrastructure development	Price and marketing information service	Regulate units of sale	Establish grades & standards	Establish National Marketing Board
AGRICULTURAL INPUTS					
Availability					
Use by farmers					-
FARMING					
Crop yields					
Crop area planted					
Use of improved seeds					
Use of fertilizer					
Use of pesticides					
Livestock production					
Production costs					
Farmer net income			.	.	
Quantity crops marketed					
Quantity livestock "					
Irrigation Water available					
Soil resource conservation					
Multicropping potential					
MARKETING, FOOD PROCESSING, FOOD DISTRIBUTION					
Infrastructure development	+				
Quantities moving in channel (domestic origin)	+	+		+	
Marketing costs	+	+	+		
Standards development					
Quantity			+	+	
Quality				+	
Market information		+	+		
Export market development		+		+	+
AGRICULTURAL SECTOR					
Crops output					
Livestock output					
GDP from agriculture				.	
Soil resources conservation					
Water resource development					
Land area cultivated					
Crop yields					
Livestock yields					
Numbers of livestock					
Fisheries output					
Forestry output					
Help small unit farmers					
NATIONAL ECONOMY					
Gross domestic product	.	.	.	.	
Self sufficiency	.	.	.	.	
Balance of payments	.	.	.	.	.
Employment	.	.	.	.	.
Government current budget	-	-	-	-	-

+ Favorable      - Unfavorable

. Indirect (favorable)

x Indirect (unfavorable)

There is a wide array of price, trade, and income policies available to the YARG to give incentives to the private enterprise economy of the YAR that will accelerate the pace of agricultural development. The major classifications include import duties and embargoes, commodity price supports, input subsidies, currency devaluation, and direct income subsidies.

#### Import Duties

Import duties tend to raise the price of imported products to YAR based consumers. Duties are a relatively low cost way for the YARG to tax and receive revenues. Indeed, these revenues generate the largest share of YARG current income. The existing import duty structure was presented in Table II. 13. Other than for fresh vegetables (107 percent), duties are generally in the 17-32 percent bracket except for wheat, wheat flour, and powdered milk on which there is no duty at all.

Theoretically, in free enterprise economy, an increase in duties tend to increase internal price levels at all points in the marketing channel including the price domestic producers are able to receive. This presumably increases the return side of the farmers cost-return relationship for the commodity on which the duty is placed and give the farmer a greater incentive to produce. In the Yemeni context, the desired effect is thwarted to a degree since the prices of cereal grains, for example, are already significantly higher for domestically grown grain than for imported grain. Most reports speak to the strong desire the Yemenis have for domestically grown food. Evidently, this desire is strong enough to allow domestically grown products to command higher prices. Cereal grains, broilers, eggs, almonds, honey, and mutton are examples. To the extent this situation persists, an increase in import duties will have less than the desired effect on producer incentive for Yemeni farmers.

A second constraining factor is the effect of increased duties on the amount of the good that will be smuggled into the country. Smuggling not only defeats the basic purpose of providing producer incentives but also deprives the government of desperately needed tax revenues. The duty elasticity of smuggling coefficients are unknown, but it can be safely hypothesized that they are higher for goods that are of higher general value per unit, easily transported, non-perishable, and are less bulky. Grains are bulky and more costly to transport over land but have less perishability. Livestock products, on the other hand, have relatively high values per unit but are perishable.

Unlike some other developing economies, the YAR does not have a serious unequal distribution of incomes. As a result, increases in the price of food, while socially undesirable have a lesser tendency to cause major repercussions among the populace in the form of public outcry condemning the

government continually assesses the possibility of raising import duties on imported food products -- particularly those that have higher income elasticity of demand coefficients such as frozen meats, eggs, and fresh citrus fruit. Furthermore --- it is suggested that a duty be considered for wheat, wheat flour, and corn.

Import duties on agricultural inputs raise a different set of problems. To stimulate Yemeni egg production by commercial growers, a low or zero duty on baby chicks and poultry feeds is desirable since it decreases the cost of production enhancing the producers cost-return relationship. On the other hand, Yemeni grain producers will have less incentive to produce thereby extending the period when poultry growers can utilize Yemeni grown grains for building their feed rations for laying hens.

With regard to fertilizers, pesticides, and improved seeds, it would seem a no duty policy is merited. It is important to stimulate the use of these newer technology inputs in order to increase yields per hectare and total production. A more careful assessment should be made for tractors and other types of labor saving machinery. It is suggested that a graduated duty be imposed on tractors -- the duty level increasing with the size (horsepower) of the tractor. Small threshers could likely be utilized effectively but, for the most part, large pieces of farm machinery and equipment should be discouraged by imposing a substantial duty. If a farming systems approach to research were adopted as recommended under the Agricultural Research section, the inputs represented by the appropriate technology packages developed and recommended to farmers should not have any duty structure.

#### Input Subsidies

In the FFYP, the YARO was in effect subsidizing inputs by extending loans through the Agricultural Credit Bank at interest rates less than the cost of alternate capital sources. It is not clear the degree, if any, that fertilizer was being subsidized.

Input subsidies reduce the cost of production for farmers and have a large number of favorable impact point (Table IV.10). They are attractive since one of the objectives in any developing economy is to get farmers to use new inputs that embody yield increasing technology; for the most part fertilizers, improved seeds, and pesticides. However, they are a direct drain on the governments current budgets.

Input subsidies are not recommended for use in the YAR. Exceptions could be in situations where the farmer is cooperating with on-farm demonstrations conducted by extension agents. The major reason for not recommending general input subsidies

to stimulate production are two fold. First, they are difficult to remove since farmers are accustomed to receiving them without engendering anti-government feelings, and, more importantly, they create distortions in relative input prices that produce negative long run effects. For example, if farm tractors were subsidized and fertilizer was not, it would encourage the use of tractors relative to fertilizer; i.e., the least cost combination input package would include relatively more tractors and less fertilizer than the combination that economic principles would dictate without the subsidy. The longer any subsidy would persist, the greater the longer run adjustments required. Tractor and machinery subsidies are the most controversial since any subsidy that encourages the use of expensive, long lasting inputs can create long run unwanted reverberations in labor markets.

#### Adjusting Currency Values

It is generally believed that the Yemen rial is currently over-valued. A devaluation of the rial would have some of the same effects as imposing higher import duties; i.e., it would make the price of imported goods higher to Yemen based consumers. The theoretical effect is that a rise in prices would improve the cost-return relationship for domestically based producers and enhance import substitution. At the same time, exports would be encouraged as Yemen produced commodities become relatively cheaper in international markets. The latter is relatively unimportant in the Yemen situation. Compared to import duties which are commodity specific, currency devaluation is general and cannot be effective in stimulating production of one commodity or set of commodities such as agricultural goods.

Also, in the case of the YAR, the inputs for a number of commodities in agriculture (e.g., poultry meat and eggs) are imported. Therefore, currency devaluation drives up the cost of production and any advantages accruing from higher product prices becomes dissipated. Unless the value of the rial would become substantially overvalued, a devaluation policy would likely have limited benefits to agriculture and therefore not generally recommended.

#### Commodity Price Supports

Price supports for non-perishable commodities have been successfully used in the more developed economies to stimulate production. The cost return relationship is improved and a large incentive exists when prices are supported above their equilibrium level and the price risk is negated. However, such programs require an administrative organization and structure that does not exist in the YAR nor could be put in place without very high cost to the YARG. Therefore,

such a policy is not recommended for the YAR because it is not administratively feasible.

#### Direct Income Subsidies

Direct income subsidies are a direct drain on the government budget and require an administrative organization capable of close monitoring at the local level. They are sometimes used in place of price supports for perishable type commodities. They are strongly not recommended for the YAR. However, there is one special case worthy of study. It is the case of the returning emigrant. If the hypothesis is true that such persons who emigrate from rural areas are not returning to the farm upon their return, a re-settlement subsidy might be — a useful scheme to give an incentive to persons to farm.

#### Import Embargoes

Embargoes have the same general effects of raising import duties that have been already discussed. Selective embargoes could have a powerful impact on stimulating local production particularly after consumer tastes are developed and there is no close substitute. Citrus fruit is a possible case in point. Embargoes tend to engender poor relations with other trading partners and are not to be recommended as a general policy.

## Crops and Livestock

The FFYP projected an annual growth rate in real GDP from agriculture of 5.5 percent compounded annually or 30.7 percent for the five year period. The SFYP includes a target of 6.0 percent per year or a 33.8 percent increase for the five years. The achieved real growth during the FFYP was very small with estimates ranging from nil to two percent annually.

### Crops

The SFYP projects a 28.8 percent increase in the GDP contribution from crops by the fifth year (1986) at 1980/81 prices (Table IV. 2). Comparing the FFYP with the SFYP as regards crop production (quantities) output plans for several of the important crops, the targeted goals are considerably more modest in the SFYP except for cotton (Table IV.11).

While there is no quantitative way to relate planned programs for the SFYP into increases in crop production, it would seem that the targets in most cases are still on the optimistic side except for vegetables. Planned investment for crop agriculture is only 7.1 percent of the total (Table IV. 1) although it is recognized most of the impact is through the regional rural development projects. The increases in sorghum and millet are expected entirely from yield increases (15% for sorghum and 20% for millet) as area planted is expected to decrease by 2.5 percent (Table IV.4). Barley hectarage is also expected to decline but a yield increase expectation of 15.6 percent is projected to increase production by 11.3 percent.

Overall the planned 5.1 percent annual compounded growth rate increase for crops originates from about a four percent increase in yield expectations, a 0.4 percent increase in area planted, and a one percent change in lower to higher value crops. Of these, the yield increase is likely the most optimistic.

Base year prices used in the SFYP appear to be higher for wheat, potatoes, and coffee but lower for millet, maize, and grapes than actual prices reported for 1980/81. Reasons for using other than actual prices are not clear. Additionally, the achieved production figures in 1980/81 for the FFYP (Table IV.) do not agree with the production bases used for the SFYP (Table IV. 2) except for maize and cotton. The base year figures of course influences the percentage increases expected in the SFYP (Tables IV. 2 and IV. ).

TABLE IV. 11

Percentage of Accounting Units in the PRODUCTION of SFYP  
with FFYP and SFYP achievements

Crop	Planned Percentage Increases Achieved		
	FFYP	SFYP	Percentage Change (FFYP)
Sorghum and millet	32.7	17.0	-17.7 -
Maize	214.3	62.9	40.0
Wheat	106.5	44.4	4.8
Barley	43.1	11.3	-17.2
Vegetables	285.2	42.9	42.6
Potatoes	373.7	50.0	72.4
Coffee	17.6	21.0	5.9
Cotton	137.0	316.0	-63.0
Tobacco	42.9	28.9	25.0
Sesame	100.0	27.9	9.1
Total (all crops)		28.8	9.1

... for both food and fodder. They are grown largely as risk aversion crops and have relatively lower income elasticities of demand in comparison with wheat and maize. In a relative sense, the objective of assisting the small scale, less commercial farmers could be served by programs to increase sorghum and millet yields. On the other hand, the objective of more GDP generated from the agricultural sector is served by an emphasis on improving wheat and corn.

For the crop subsectors as a whole, a number of the programs planned in the SFYP are wise. These include continued development of the Plant Protection Center at Shoub Farm. Complementing the Centers programs would be a plan to develop an early warning system for pest control and plant inspection procedures at ports of entry.

The project to develop fruit tree nurseries is recommended and it is suggested that assistance be sought to develop a seed multiplication farm with companion seed processing capabilities. Such a farm should be coordinated with agricultural research efforts in crop improvement.

#### Livestock

The SFYP projects a 44.9 growth in livestock products value or an annual compounded growth rate of just under 8.0 percent. (Table IV. 3). White meat (poultry) is planned for a 75.1 percent growth compared to 23.6 percent for red meats for the five year period. Eggs are at 56.1 percent and milk 36.0 percent. While these targets represent a rate of gain higher than for crops, they would seem to be relatively more achievable than the crop goals. The private sector will more rapidly invest in the livestock products subsectors and move production ahead than for crops.

The recommendations are to concentrate efforts to sheep improvement relative to beef. The only poultry production development project of merit for YARG investment might be small flock (dual purpose type) development projects for women in the villages. Training efforts for livestock technicians, however, is strongly recommended. The YARG can assist by loaning money to private investors or take a partial equity position in a hide and skin processing plant and a blood and by-products processing plant. Presently, the skin and carcass not consumed as food is often wasted. The Veterinary Services Project should be continued with both its training and diagnostic laboratory components.

It is recommended that YARG begin a study of how rangelands can be managed to preserve the soil and provide forage for grazing animals. This study would complement efforts in water resources development. Public sector monitoring and grazing uses regulation of the vast areas of rangeland in the YAR should be considered. With proper management, these rangelands can make a significantly greater contribution to livestock production. In this regard, there are a number of alternate management systems to be considered.

Forestry and Fisheries

less than one percent of the investment budget (Table IV. 1 and IV. 3). With the high price of fuelwood, it would seem to merit more attention. The feasibility of a forest nursery with subsequent seedling distribution and planting programs should be considered.

The fisheries subsector is planned for a growth of 57.4 percent for the five year period or an annual compounded growth rate of 10 percent. With fisheries planned to receive 454 million YR or 10 percent of the total budget, the targets would seem to be in reach. The YARG is to provide loans to fishermen for 100 new boats and catching equipment. New harbor facilities are planned in two locations and four fish marketing centers with cold storage capacity are planned for Sanaa, Ibb, Taiz, and Dhamar.

TABLE IV. 10

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Impact Matrix Relating Policies to Goals and Objectives  
Price, Income, and Trade Policies

Goals, and Objectives or Impact Incidence	Raise import duties on:												
	Cereal grains	Livestock products	Vegetables	Fruits	Subsidize input prices:				Commodity Price supports Crops	Import Embargoes	Regulate Marketing Margins	Direct Income Subsidies	Devalue Currency
					Fertilizer	Seeds	Pesticides	Farm Machinery					
<b>AGRICULTURAL INPUTS</b>													
Availability					+	+	+	+					
Use by farmers					+	+	+	+					
<b>FARMING</b>													
Crop yields					+	+	+	+					
Crop area planted	+		+	+									
Use of improved seeds	+		+	+		+							
Use of fertilizer	+		+	+	+								
Use of pesticides	+		+	+			+						
Livestock yields		+											
Production cost					+	+	+	+					
Current net income					+	+	+	+					
Quantity crops marketed					+	+	+	+					
Quantity livestock													
Irrigation Water Available													
Soil resource conservation													
Water cropping potential													
<b>MARKETING, FOOD PROCESSING, FOOD DISTRIBUTION</b>													
Infrastructure development													
Quantities moving in channel (domestic origin)	+	+	+	+	+	+	+	+			+		
Marketing costs													
Standards development													
Quantity													
Quality													
Export marketdev.													
<b>AGRICULTURAL SECTOR</b>													
Crops output	+		+	+	+	+	+	+					
Livestock output		+											
GDP from agriculture	+	+	+	+	+	+	+	+					
Soil resources conservation													
Water resource development													
Land area cultivated													
Crop yields													
Livestock yields													
Numbers of livestock													
Fisheries output													
Forestry output													
Help small unit farmers	+	+	+	+	+	+	+	+					
<b>NATIONAL ECONOMY</b>													
Gross domestic product	+	+	+	+	+	+	+	+					
Self sufficiency	+	+	+	+	+	+	+	+					
Balance of payments	+	+	+	+	+	+	+	+					
Employment	+	+	+	+	+	+	+	+					
Government current budget	+	+	+	+	+	+	+	+					

+ Favorable Impact - Unfavorable Impact . Questionable Impact

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