JAMHUURIYADDA DIMOQRAADIGA SOMAALIYA
WASAARADDA BEERAHA
SOMALI DEMOCRATIC REPUBLIC
MINISTRY OF AGRICULTURE

GENALE-BULO MARERTA PROJECT

ANNEX VIII
Economic and Financial Analyses

ANNEX IX
Management and Implementation

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PROJECT AREA AND STUDY AREA

This study contained two elements, a Master Plan covering 67 400 hectares and a feasibility study of 5 000 hectares.

Throughout the reports the term Study Area refers to the area covered by the Master Plan studies and the term Project Area is used for the feasibility study area.

GLOSSARY OF SOMALI TERMS

Cambuulo	-	Traditional dish of chopped boiled maize with cowpeas or green grams.
Chiko	-	Chewing tobacco
Der	-	Rainy season from October to December
Dharab	-	Five jibals or approximately 0.31 ha
Gu	-	Rainy season in April and May
Hafir	-	Large reservoir on farms for storing water for use in dry periods
Hagai	-	Climatic season June to September characterised by light scattered showers
Jibal	-	Area of land approximately 25 m by 25 m or 0.0625 ha
Jilal	-	Dry season from January to April
Kawawa	-	Two man implement for forming irrigation ditches
Moos	-	Measurement of land area equal to a quarter of a jibal
Quintal	-	Unit of weight measurement equivalent to 100 kg
Uar	-	See hafir
Yambo	-	Small short-handled hoe
Zareebas	-	Thorn cattle pen

SPELLINGS OF PLACE NAMES

Throughout the report Somali spellings have been used for place names with the exception of Mogadishu where the English spelling has been used. To avoid misunderstanding, we give below a selected list of Somali, English and Italian spellings where these differ.

Somali	English	Italian
Afgooye	Afgoi	Afgoi
Awdheegle	-	Audegle
Balcad	Balad	Balad
Baraawe	Brava	Brava
Buulo Mareerta	Bulo Marerta	Bulo Mererta
Falkeerow	-	Falcheiro
Gayweerow	-	Gaivero
Golweyn	-	Goluen
Hawaay	Avai	Avai
Hargeysa	Hargeisa	-
Janaale	Genale	Genale
Jelib	Gelib	Gelib
Jowhar	Johar	Giohar
Kismaayo	Kisimaio	Chisimaio
Marka	Merca	Merca
Muqdisho	Mogadishu	Mogadiscio
Qoryooley	-	Coriolei
Shabeelle	Shebelli	Scebeli
Shalambood	Shalambot	Scialambot

ABBREVIATIONS USED IN THE REPORTS

ADB	African Development Bank
ADC	Agricultural Development Corporation
CARS	Central Agricultural Research Station - Afgooye
DAP	Diammonium phosphate
EDF	European Development Fund
ENB	National Banana Board
FAO	Food and Agriculture Organisation
FAO/PP	FAO Pilot Project (Afgooye - Mordiile Project)
HASA	Hides and Skins Agency
HTS	Hunting Technical Services Limited
HV	High volume (crop sprayer)
IBRD	International Bank for Reconstruction and Development (the World Bank)
ITCZ	Inter-tropical convergence zone
ITDG	Intermediate Technology Development Group (London)
JOSR	Jowhar Offstream Storage Reservoir
LDA	Livestock Development Agency
Libsoma	Libya-Somalia Agricultural Development Company
LSU	Livestock unit
LV	Low volume (crop sprayer)
MLFR	Ministry of Livestock, Forestry and Range
MMP	Sir M. MacDonald & Partners
NCA	Net cultivable area
NCB	National Commercial and Savings Bank (formerly National Commercial Bank)
ONAT	National Farm Machinery and Agricultural Supply Service
PLO	Palestine Liberation Organisation
SDB	Somali Development Bank
SNAI	Jowhar Sugar Estate
TDN	Total digestible nutrients
TDP	Total digestible protein
ULV	Ultra-low volume (crop sprayer)
UNDP	United Nations Development Programme
USBR	United States Bureau of Reclamation
USDA SCS	United States Department of Agriculture, Soil Conservation Service
WHO	World Health Organisation

RATE OF EXCHANGE

Throughout the period of the study, the rate of exchange remained fixed at:

US $ 1.00 = So. Shs. 6.295

PART I

INTRODUCTION AND SUMMARY

CHAPTER 1

INTRODUCTION AND SUMMARY

1.1 Background and Study Rationale

The Janaale - Buulo Mareerta Study Area lies in the Lower Shabeelle region (Figures 1.1 and 1.2) which is the most important crop producing area of Somalia. The Study Area comprises 67 400 ha of river flood plain soils, of which 20 000 ha are currently irrigated, using water from the Shabeelle river. This represents some 20% of the total irrigated land in Somalia. Land classification studies have shown that 90% of the area is suitable or moderately suitable for irrigation. However, the principal constraint on expansion of irrigated agriculture is likely to be the limited availability of water rather than the scarcity of land.

Riverflows are seasonal and totally dependent upon rainfall in the upper, Ethiopian, sector of the catchment; the local rainfall is very erratic and contributes little to the water supply apart from supplementing irrigated cropping. The poor quality of the groundwater severely limits its use for irrigation. The water resources of the Study Area are therefore totally dependent upon the supply and demand situation along the upstream irrigated reaches of the Shabeelle river. Indeed, water supplies in the area are becoming limited and at present the available flow in the river is less than the demand for water in one year out of four in the months of June and July.

In view of the present water supply situation, it is therefore essential that future irrigation expansion in the Study Area be planned so that water demands during the critical June-July period do not exceed current levels. However, there is considerable uncertainty as to proposals for future extension of cropping in the region as a whole: if all currently proposed projects in the Lower Shabeelle region were to be implemented, there would be further water shortages, which would reduce the downstream irrigation development potential, especially in the present Study Area. Under the Terms of Reference the Consultants were required to examine possible developments only within the 70 000 ha Janaale-Buulo Mareerta zone. For the purposes of economic planning, it has therefore been necessary to assume that no further developments will take place elsewhere along the Shabeelle river. This method enables the projects identified in the Study Area to be compared with outside projects. Taking account of the restriction of water supplies during the months of June and July, it is estimated that irrigation in the Study Area could be expanded from the present 20 000 ha to a total of 36 000 ha.

The objectives of the developments proposed in the present study are to increase the agricultural production of the area through better irrigation and production methods and to share the benefits of these improvements by establishing producer co-operatives. It is planned that the members of these co-operatives should achieve the target income set by the International Labour Organisation (ILO, 1977); this is approximately twice the current average income in the area.

1.2 Methods of Study

The overall study was carried out in three phases :

(a) Phase I included a brief reconnaissance of the Study Area and the selection of an area of 5 000 ha in which to carry out feasibility studies for irrigated agriculture. An area of 5 800 ha (gross), lying on the right bank of the Shabeelle river near the village of Qoryooley, was selected for these feasibility studies.

(b) Phase II comprised the detailed studies required for the feasibility planning of the Qoryooley project.

(c) Phase III involved the preparation of a Master Plan for the whole Study Area.

The economic and financial aspects, contained in this annex, are presented in terms of the general background data (Part II), feasibility study analyses for the Qoryooley project (Part III) and financial and economic analyses relating to the Master Plan, (Part IV).

1.3 Summary of Results

(i) Feasibility Study

The development of the Qoryooley area is based on the establishment of a pilot farm and eight village co-operatives, involving 2 089 family units. The traditional crops of maize and sesame will be grown, with production increasing by 4 500 and 245 tonnes, respectively. Cash crops of rice and cotton would be introduced to give outputs of 3 000 tonnes of milled rice and 3 400 tonnes of seed cotton. The current cropped area is 2 227 ha but with implementation of the development proposed it it would rise to 3 963 ha.

The capital costs of the proposed project are So. Shs. 90 million with a further investment of So. Shs. 10 million required for agricultural machinery. Operation and maintenance charges amount to about So. Shs. 3.0 million annually. All farms are scheduled to be in production by year 7, and the full project output should be realised by year 14. The economic analysis shows an internal rate of return of 9.6%, which is considered to be reasonable for a fairly capital intensive agricultural project in Somalia. The foreign exchange flow is very favourable, giving a net present value of So. Shs. 68.5 million, discounted at 10% over 30 years. At maturity, the co-operative members would receive the proposed minimum annual income of So. Shs. 4 400, which represents twice their present average income.

Annual charges to cover operation and maintenance, amounting to So. Shs. 9.5 million, would be paid to the project authority by the village co-operatives, leaving about So. Shs. 6.0 million to cover annual servicing and repayment of capital debt.

(ii) Master Plan

The Master Planning studies identified eight specific projects for major development; in addition several areas were demarcated as development zones within which minor developments are recommended.

(a) Projects Identified

Qoryooley project (5 800 ha). This project has been prepared to feasibility study level, as described in the previous section. Developments proposed entail the improvement of irrigation and establishment of producer co-operatives.

Faraxaane, Shalambood and Golweyn projects. These have a total gross area of 12 700 ha and involve around 4 800 family units. Each project is similar to the Qoryooley scheme.

Asayle project (4 170 ha). This is also similar to the Qoryooley project but includes 11 existing large farms.

Mukoy Dumis project. This covers 2 000 ha of uncultivated and largely uninhabited land; it was selected to determine the feasibility of developing virgin land for irrigation.

Der flood project (1 200 ha). This scheme is proposed to test the feasibility of cropping during only the der season.

Banana drainage project. This is proposed to evaluate the feasibility of installing drainage and improving management in 2 800 ha of existing banana plantations.

(b) Development Zones

Those sectors of the Study Area which remain outside the limits of the proposed projects have been divided into development zones, in which a general upgrading of agricultural activity is recommended.

The economic viability of each project has been tested and the projects ranked in order of their economic attractiveness. All the projects, except Asayle, give internal economic rates of return (IRR) greater than 8.0%. Of the projects involving annual cropping, Golweyn has the highest IRR at over 13.0%. The values, discounted at 10% over 30 years, confirmed the economic order of priority to be :-

1. Golweyn
2. Der flood
3. Shalambood
4. Faraxaane
5. Mukoy Dumis
6. Asayle

A financial analysis was carried out for each project and an indication of repayment capacity is provided.

As a result of the analyses performed, it is concluded that the der flood and banana drainage projects and the development zone proposals should be initiated as soon as possible. The Golweyn, Shalambood and Faraxaane projects should follow in that order, after the Qoryooley project is completed. It is further recommended that a study be made of the banana industry, with the objective of determining the best means of raising the level of production and increasing exports.

Implementation of all projects identified would lead to considerable increases in production from the Study Area. Annual production of maize would be raised by 30 000 to 40 000 tonnes, rice by 15 000 to 20 000 tonnes, sesame by 6 000 to 7. 000 tonnes, and cotton by 12 000 to 16 000 tonnes. Banana production could increase by over 20 000 tonnes but this would be dependent upon higher managerial and technical inputs.

Most families in the Study Area would be able to achieve an annual income of So. Shs. 4 400, except in some of the more densely populated development zones, where higher income would be dependent upon finding employment in the banana plantations.

The Janaale, Falkeerow and Qoryooley barrages all require renovation. Janaale is critical and should be renovated immediately. The condition of the Falkeerow barrage is less critical and repairs could be delayed for up to five years, provided some downstream works are executed immediately. The Qoryooley barrage needs only minor repairs as, after the Faraxaane project is commissioned, it will cease to be required. The total cost of renovations is about So. Shs. 10.5 million.

1.4 Conclusions

This study has indicated the viability of the Qoryooley project and an order of priority for implementation of other developments in the Study Area. Economically and financially, most of these projects are viable. However, several constraints on successful development have been identified :-

(a) Water Availability

Water supplies are already critical in the June-July period; to regularise this and to obviate further deficiencies occurring in the future, a co-ordinated plan for water use in the Lower Shabeelle basin is urgently required.

(b) Establishment of Producer Co-operatives

The developments proposed are based on the setting-up of producer co-operatives, with present land owners losing their direct rights to land, and taking an equal share in the co-operatives, which will require relocation of many families. Producer co-operatives are relatively new to Somalia, thus their successful establishment will require considerable care.

(c) Supplies of Farm Inputs

The proposed developments will require a large increase in farm inputs which will necessitate a considerable strengthening of existing government purchasing and supply agencies to meet the new demands.

(d) Trained Staff

The present lack of trained personnel could be critical for successful development. It is therefore essential that training facilities be increased and personnel be made available to the area.

If these constraints are overcome, the possibilities for the area are considerable, including the social benefit of doubling the average household income, as well as economic benefits to the country as a whole.

PART II

ECONOMIC BACKGROUND

CHAPTER 2

ECONOMIC AND AGRICULTURAL BACKGROUND

Somalia has an estimated per capita gross domestic produce of approximately US $ 100 (IBRD, 1977). Population is estimated at approximately 3.5 million people with a growth rate of about 2.6% 1970-75 (IBRD, 1977). The country has no national accounts and is still awaiting the results of the 1975 population census. An indication of the composition and change in Gross Domestic Product has been prepared by the UNCTAD Secretariat and is shown in Table 2.1.

TABLE 2.1

Gross Domestic Product by Major Activities

Contribution to GNP (%)	1960	1970	1973
Agriculture	45	38	32
Industrial activity			
Manufacturing	(4)	(7)	(9)
Total	12	14	15
Construction	5	5	5
Transport, commerce and others	38	43	48
GDP(1) (manufacturer's price So.Shs. million)	1 146	1 356	1 601

Note: (1) At 1970 prices.

Source: UNCTAD Secretariat

The levels of economic activity in the non-agricultural sector are probably representative. There are however considerable possibilities of underestimation in the agricultural sector where autoconsumption is high, hectares and yields are unknown and there is a large nomadic population herding livestock. Caution should therefore be shown in interpreting these figures.

To illustrate the importance of agricultural production, rough estimates of the total value of agricultural production are given in Table 2.2. These figures are indicative of the order of magnitude, and in the absence of other statistics provide some indication of the country's activities.

TABLE 2.2

National Productional of Major Agricultural Products in 1977

Crop	Production ('000 tonnes)	Value at farm gate (So.Shs. million) (1)
Sorghum	74	55.5
Maize	80	60.0
Rice	4	0.1
Sesame	28	67.0
Groundnuts	0.5	0.7
Cotton	3	2.5
Pulses	56	56.0
Bananas	93	70.0
Sub-total		309.0
Livestock		
Live animals, average offtake 10%, average value So.Shs. 300		700
TOTAL		1 009

Note: (1) Taken at producer prices.

Source: Ministry of Agriculture estimates

Somalia was seriously affected by a drought in 1974-75 and is only now recovering from its effects with overall domestic output not yet reaching pre-drought levels.

The balance of payments (Table 2.3) is characterised by large deficits on the balance of goods and services, which are financed by inflows of grants and loans. The balance of goods and services has deteriorated almost continuously since 1971, except for a slight improvement in 1975. The unrequitted transfers and capital inflow increased considerably towards the end of the drought years and have continued to increase, giving a record surplus in 1975. It has since declined. Deficits in Somalia's international transactions have been increasing in recent years. Exports covered about 67% of imports in 1970-71 but this fell to about 40% by 1976-77. Disbursed debt has increased from So.Shs. 702 million in 1972 to So.Shs. 1 745 million by 1976 (Table 2.4) and the debt service payments have increased from So.Shs. 18 million in 1971-73 to So.Shs. 36 million in 1976. The payments due on public and publicly guaranteed debt are shown in Table 2.5.

TABLE 2.3

Summary Balance of Payments 1969 - 77 (So.Shs. million)

Year	Goods and services net	Unrequitted transfers net	Capital account	Special drawing rights	Net balance
1969	-131	84	80	-	41
1970	-133	93	85	18	56
1971	-133	137	45	14	58
1972	-167	118	154	14	124
1973	-423	178	249	-	-2
1974	-651	326	202	-	-126
1975	-644	644	194	-	182
1976(1)	-693	257	539		107
1977(2)	-971	407	610		47

Notes: (1) Provisional
(2) Estimates

Sources: IBRD East Africa Mission
Central Bank of Somalia

TABLE 2.4

External Debt 1972 - 76 (So.Shs. million)

	1972	1973	1974	1975	1976
Total disbursed debt	702	871	1 151	1 385	1 745

Source: Data from Somali authorities

TABLE 2.5

Service Payments on Public and Publicly Guaranteed Debt 1976-81(1) (So.Shs. million)

	1976	1977	1978	1979	1980	1981
Total service payments	19	68	72	91	114	224
Ratio of service payments to exports of goods and services (%)	2.7	9.6	-	-	-	-

Note: (1) Based on data as at September 30th 1977

Source: IBRD East Africa Mission estimates

TABLE 2.6

Somalia: Exports by Commodity (So.Shs. million)

Commodity	1966	1967	1968	1 969	1970	1971	1972	1973	1974	1975	1976	1977
Bananas					62.9	63.6	78.2	67.6	79.8	64.4	88.2(1)	66.5(1)
Live animals					119.3	123.7	1 62.0	175.1	222.4	382.0	301.9(2)	32.0(2)
Meat and meat products					6.4	21.5	22.6	22.6	35.8	44.1	45.0(3)	50.0(3)
Hides and skins					15.0	179.0	17.1	13.1	14.1	26.3	42.6(4)	53.0(4)
Wood products and charcoal					-	-	5.0	5.3	0.9	-	NA	NA
Fish and fish products					1.5	2.9	5.2	13.5	15.2	11.6	NA	NA
Other					19.3	17.2	9.8	43.2	22.4	29.2	NA	NA
Total					224.3	246.7	299.9	340.4	390.6	557.6	537	533
							percentages					
Bananas	42	34	28	24	28	26	26	20	20	12	16	13
Live animals	41	49	59	57	53	50	54	51	57	69	56	60
Meat and meat products	1	1	1	1	3	9	8	7	9	8	8(4)	9(4)
Hides and skins	4	5	6	7	7	7	6	4	4	5	8	10
Wood products and charcoal	-	-	-	-	-	-	2	2	-	-	NA	NA
Fish and fish products	-	-	-	-	-	1	2	4	4	2	NA	NA
Other	12	11	6	11	9	7	3	13	6	5	NA	NA

Notes: (1) ENB estimates
(2) LDA estimates
(3) Own estimates
(4) HASA estimates

source: Customs data from somali authorities

Although Somalia has recently kept a credit on the balance of payments, this disguises the worsening position of the balance of trade, financed out of loans and grants which, in turn, are increasing the country's indebtedness, so that in 1977 service payments on debt were almost 10% of receipts from exports. This unfavourable foreign exchange position means that all new agricultural projects should have a favourable foreign exchange flow of import saving or exportable crops against direct expenditures.

Somalia's economy is based on agriculture, which accounts for nearly 100% of exports and employs over 80% of the national labour force. Figures for income generated, by sector, are not available. Not only are agricultural commodities almost the only export but these exports are dominated by live animals (50 to 60%) and bananas (20 to 28%), with livestock products accounting for a further 10% (Table 2.6).

Despite a fall in the volume of exports in 1975 and 1976, income has been partially maintained by the increasingly favourable terms of trade (Table 2.7). The livestock sector, accounting for 60 to 65% of export earnings in 1975-76, has not yet fully recovered from the effects of the drought. It is possible therefore, that there will be an increase in livestock marketing in the future. Livestock production is the principal economic activity of the country with approximately two-thirds of the population, predominantly nomads, engaged in it.

TABLE 2.7

Terms of Trade 1973-77

	1973	1974	1975	1976	1977
Index of export prices(1)	100	132.2	175.7	216.9	210.5
Index of import prices(1)	100	132.0	146.4	153.0	174.5
Terms of trade	100	100.2	120.0	141.8	120.6

Note: (1) Laspeyres Price Index

Source: IMF estimates

The most important crops are sorghum and sesame, which are grown mainly in rainfed areas. These crops, together with maize produced under irrigation, are grown mainly for local consumption. Bananas form the most important cash crop with rice and cotton currently occupying fairly small hectarages. Bananas are the only crop grown for export but recently they have been declining in importance.

Imports of cereals, rice, maize and wheat have been increasing and were valued at over So.Shs. 100 million in 1976 or 10% of the import expenditure. This would appear to provide considerable possibilities for import substitution as well as export promotion of the existing livestock and bananas.

CHAPTER 3

LAND AND HUMAN RESOURCES

3.1 Land Resources

Although there is considerable doubt as to the precise distribution of land use in Somalia, there is a general consensus that of the total land area of 637 000 km^2, 10 to 14% is cultivable and of that, about 1% is cultivated. The balance of 86 to 90% of the land is rangeland of varied degrees of productivity. Of the cultivated land, about 15 to 20%, or 100 000 ha, is irrigated, all of which is situated in the south of the country. The Lower Shabeelle basin, in which the present Study Area is located, is the most important crop producing region in Somalia (see Annex IV).

The Study Area, comprising 67 400 ha, is one of the most important irrigated areas within the Lower Shabeelle basin. The principal crops grown are maize (23 226 ha), sesame (10 954 ha) and bananas (3 420 ha), which represent, respectively, about 20%, 2% and 41% of the national hectarage. Table 3.1 shows that 11% of the Study Area is currently under perennial crops (bananas), 40% under irrigated annual cropping and a further 22% under marginally irrigated annual crops. In fact, 73% of the gross area is currently receiving some irrigation at some time during the year.

TABLE 3.1

Summary of Land Use (ha)

Land use category		Study Area	
		NCA	Gross area
1.	Uncultivated		17 450
2.	Rainfed	198	640
	Marginal irrigated annual	4 880	14 925
3.	Irrigated annual	11 512	27 010
4.	Irrigated perennial	4 372	7 385
	Total irrigated	20 764	49 320
	TOTAL	20 962	67 410

The soil and land classification studies described in Annex I have indicated that some 90% of the land in the Study Area is suitable or moderately suitable for irrigation.

3.2 Water Resources

The water resources of the Study Area are totally dependent on the water demand and supply situation along the upstream irrigated reaches of the Shabeelle (see Annex II). Under the existing situation the available flow in the river is less than the demand for water in one year out of four in the months of June and July. This means that in the second half of the gu season, water supplies to the existing irrigated areas can be guaranteed at only the 75% level of reliability. Therefore, for planning purposes, gu season water demands in the Study Area (especially June and July) should be maintained at the existing levels.

The objective of the present study is to increase the agricultural production of the area through better irrigation and production methods. As water is scarce, it was decided to base new irrigation levels on existing, albeit inefficient, water usage, but it is proposed that the net cropped areas be expanded to the maximum for which water is available in the der season, namely from the present 20 764 ha to a total of 36 681 ha. The main method of improvement will be through upgrading irrigation practices by providing regular water supplies, land levelling and necessary infrastructural improvements.

3.3 Cropping

The annual cropping pattern throughout the Study Area is fairly uniform (Table 3.2) based on maize, sesame and vegetables; small quantities of tobacco and tomatoes are also grown.

TABLE 3.2

Basic Annual Cropping Pattern in Study Area (percentages of NCA)

	Gu	Catch-crop(1)	Der
Maize	100	-	40
Sesame	-	-	60
Vegetables/Pulses	-	30	-

Note : (1) A catch-crop occurs between the gu and der seasons.

The value of present production assumed in the economic analysis is based on the existing situation as it is considered that there is not likely to be any change in present production without implementation of the proposed developments. For the economic analysis of the banana farms, the value of the without project production assumes declining yields as there is clearly a long term trend of yield decline, which is probably caused by poor drainage, nematode infestation and low levels of management.

3.4 Human Resources

Prior to the census in 1975, the population of Somalia had been estimated at 3.2 million. The State Planning Commission, however, has recently estimated the 1975 population to be 3.5 million. The agricultural labour force of 1.24 million is estimated to be about 80% of the total whereas 7% is in the industrial sector and 13% in the services sector. Furthermore, it is estimated that 65% of the population have livestock as their main source of income, the majority of these being pastoralists and nomads. It is recognised that at present the rangelands should, at the most, maintain their existing human population so all increases of population must be absorbed by other sectors - probably mainly agriculture. Table 3.3 illustrates this problem, demonstrating the considerable increase in employment opportunities that will be required in the agricultural sector.

The Government already has some experience in resettling people, particularly in the Dujuma, Kurtenwaarey and Sablaale settlement projects and, although there are still many problems to be solved, this type of relocation can work and provides a basic pool of new agricultural labour.

The population and labour availability of the Study Area have been covered in Annexes III and IV. The principal conclusion drawn was that in this relatively densely populated area there is considerable underemployment and hidden unemployment, particularly when calculated according to the labour requirements of the crops grown. There are also many areas where it is claimed that work is actively sought but not found. But this conflicts with the main employers of the area - the banana farmers and large farmers - who consider there is a labour shortage. Two explanations are suggested, first that seasonal peaks in labour demand lead to temporary shortages, second that the labour is relatively immobile. The opportunity cost of leisure appears to be quite high, particularly when work necessitates travelling. These two factors of availability of labour have to be considered in the development plans for the area.

The population of the Study Area is estimated to be 112 500 inhabitants living in 128 villages distributed fairly evenly throughout the area, giving an average density of 167 people per km^2. There are approximately 18 940 household-families living in the Study Area, of which the average size is estimated to be 5.93 people, comprising, on average, two adults, two children below the age of 14 and one or two other non-adults. To assess the balance of supply and demand of labour in the area it is assumed that there are two people per household-family permanently available for work (Annex IV, Appendix A). Figure 3.1 confirms the abundance of labour for the present agricultural system.

3.5 Livestock

Although livestock production (Annex V) is of secondary importance to agricultural cropping, there is still a very high density of livestock in the area. The numbers of livestock estimated to be in the Study Area are shown in Table 3.4. Each family possesses, on average, 3.14 livestock units (LSU - as defined in Annex V). Animals are kept primarily for milk production and over 90% of the total livestock biomass comprises cattle. On average each household owns 3.5 cattle, 0.13 camel, 1.08 sheep and 0.20 goat but about 50% of households have no cattle at all. The development proposals for the area should aim to upgrade the quality of the animals and improve their production performance. For the purpose of evaluation, households are considered to be the basic production unit and average family livestock holdings are used.

TABLE 3.3

Possible Absorption by Sector of Somalia's Additional Population 1977-81(1)

Sector	Assumed proportion of 1976 population (%)	Annual 1976 population ('000) (3)	Annual growth rate (%)	1977-81 population increase ('000)	1977-81 population increase after relocation ('000) (2)	1977-81 annual population increase ('000)
Nomadic and semi-nomadic livestock production	65	2 275	1.7	200	-	
Agriculture	15	525	2.2	60	234	47
Fisheries	1	35	2.2	4	30	6
Urban industry services	19	665	4.9	180	180	34
Total	100	3 500	2.4	444	444	

Notes: (1) The figures relate to total population and not to labour force or households

(2) The term 'relocation' means the absorption of population by other sectors

(3) 1975/76 census population 3.5 million

Source: Based on International Labour Office report 1976, 1964-85 labour force projections : part II, Africa, Geneva. Modified as a result of 1975 census when population estimated to be 3.5 million.

TABLE 3.4

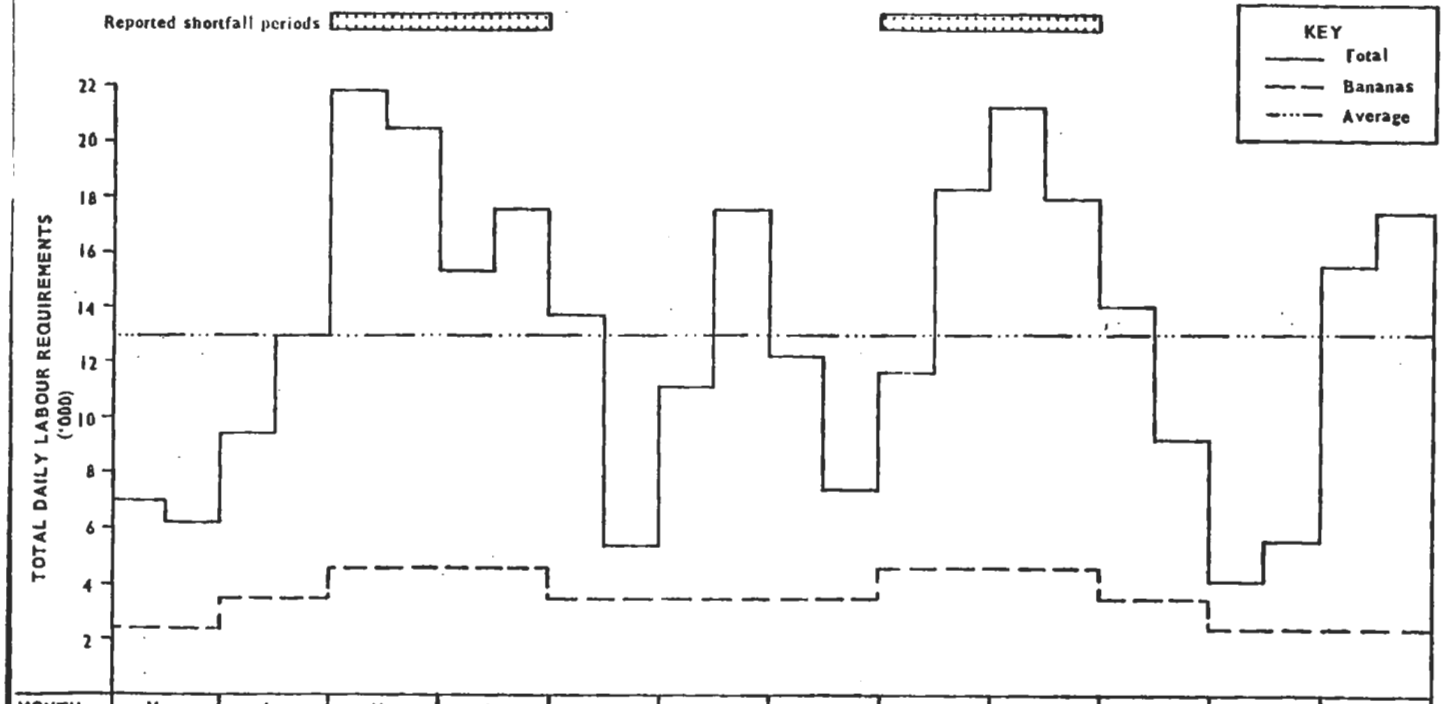
Livestock Numbers in Study Area

	Number per family	Total numbers
Household-families	-	18 940
Livestock		
Cattle	3.5	66 290
Camels	0.13	2 462
Sheep	1.08	20 445
Goats	0.20	3 788
Livestock units (LSU)	3.14	

Source : Livestock survey 1978 (Annex V)

STUDY AREA CROP PRODUCTION
TOTAL DAILY LABOUR REQUIREMENTS AND AVAILABILITY (1977)

FIGURE 3-1



MONTH	M		A	M		J		J	A	S	O	N	D	J		F	
SEASON	Jilal		Gu			Hagai					Der			Jilal			
Annual Crop	4680	3930	5900	9380	17120	15740	10620	12850	10210	1830	7600	14050	8710	3920	6960	13560	16510	13290	11070	5710	1720	3160	13120	15060
Bananas	2360	2360	3500	3500	4640	4640	4640	4640	3500	3500	3500	3500	3500	3500	4640	4640	4640	4640	3500	3500	2360	2360	2360	2360
TOTAL	7040	6290	9400	12880	21760	20380	15260	17490	13710	5330	11100	17550	12210	7420	11610	17200	21150	17930	14570	9210	4080	5520	15480	17420

Maximum daily labour requirement:- 21760 working people per day (May)
Maximum available workforce :- 37880 people (3)
Maximum utilization :- 57.4% available manpower

Notes:- (1) See Figure A. 2
(2) See Section A.7
(3) See Section A.2

Source Annex IV Appendix A

CHAPTER 4

MARKETS AND PRICES

4.1 Introduction

In this chapter the markets and prices of the relevant commodities are summarised; a full analysis is presented in Appendix C. The crops of major importance are reviewed, namely cereals (including rice), oilseeds (mainly sesame), cotton, bananas and grapefruit. The need to include grapefruit is prompted by the large grapefruit scheme proposed for the Study Area. The most obvious omission is sugar, but as there is a large sugar project currently under development in the Juba valley there are no official plans to increase sugar production further in Somalia.

4.2 Cereals

No accurate statistics exist for cereal production in Somalia; estimates have therefore been based on the Agricultural Development Corporation (ADC) purchases, which have been running at about 50 000 to 60 000 tonnes of maize per annum, except for the drought years of 1973, 1974 and 1975. These purchases suggest that total national production is around 100 000 tonnes per annum. It is impossible to indicate a trend in production given these poor statistics and the recent drought years. Total cereal production, however, is now regarded as having at least recovered to its pre-drought production levels.

The Study Area grows about 22% of the country's maize. Total rice production is estimated to be about 3 500 tonnes, half of which is grown in the Lower Shabeelle area and 9% in the Study Area.

FAO estimates present annual consumption of cereals to be about 370 000 tonnes, the majority being maize and sorghum (320 000 tonnes) and rice (30 000 tonnes). The national import figures, however, would suggest that rice has exceeded this figure by 4 000 to 5 000 tonnes. FAO also estimates that there will be an overall 4% per annum increase in demand for cereals, giving a total demand of 494 000 tonnes by 1990.

External trade in cereals has been considerable and is increasing irrespective of the effects of the drought. Rice imports have tended to hover around 20 000 tonnes, but 28 750 tonnes were imported in 1977 and more is proposed for 1978. Maize, a crop rarely imported prior to 1971, was imported for the drought years and is still being imported at the rate of 30 000 tonnes per annum. Wheat and wheat flour imports have also been rising considerably.

There is a consumer preference for rice rather than wheat. With this, and the increasing imports of both commodities, there is considerable opportunity for import substitution. Conservative estimates predict an annual deficit of over 50 000 tonnes for rice and at least as much for maize, by the year 1990.

4.3 Oilseeds

Production statistics for sesame, which accounts for over 90% of oilseed production in Somalia, should be treated with caution. ADC purchases of sesame from producers are an indication of production: these show that production has not yet reached the pre-drought levels of 12 000 tonnes and are currently (1977) running at about 10 000 tonnes annually. Taking these figures as representing, at the most, 50% of total production levels, then the country is probably producing at least 20 000 tonnes of sesame. Consumption of oil is estimated to be about 15 000 tonnes per annum, of which 50% is imported. Somalis show a distinct consumer preference for sesame oil. If a 3% per annum growth rate in demand is assumed (hardly more than the estimated rate of population increase) then there will be a 19 000 to 20 000 tonnes oil deficit in 20 years. This is equivalent to a requirement of 57 000 tonnes of sesame at a 35% extraction rate.

There is therefore a ready market for increased sesame production in the Study Area.

4.4 Cotton

All cotton produced in Somalia is processed at the Somaltex textile mill near Balcad, which is the only mill in the country. It is estimated that total seed cotton production in 1976/77 was about 770 tonnes, equivalent to 260 tonnes of fibre. Somaltex processed about 900 tonnes of fibre in 1977, the balance of the supply being imported.

The textile market in Somalia is very dependent on imports. However, it is difficult to assess what proportion of the total market Somaltex could supply, because of the lower quality yarn produced. As the mill is at present supplying only 5% of the country's textile demand and as 70% of this is produced from imported lint, there is considerable scope for expansion of domestic cotton production.

The textile mill, with a design capacity of 2 250 tonnes of cotton fibre, is currently working at only 40% capacity. Locally grown cotton is therefore providing only 10% of this present capacity. Although there are problems, such as poor quality seed cotton, these could be overcome by better management. The market prospects indicate a ready market for increased local production of reasonable quality seed cotton and suggest that all of the production from the Study Area could be absorbed.

4.5 Bananas

Bananas are imported as an export crop, particularly in the Study Area, where about 43% of the country's bananas are grown. At present there is a serious decline in banana production; exports have fallen from 134 000 tonnes in 1972 to a low of 54 000 tonnes in 1977. The decline has been brought about by low profitability and through production problems of disease, bad drainage and poor management.

The traditional market for Somali bananas has been Italy, but since 1970 the Middle East has been taking up to 60% in the peak years. Exports to the Middle East stopped in 1977 due to repudiation of the contract. However, a new contract

has been signed for six months in 1978. It would appear that the Middle East is a fast expanding market (48 000 tonnes of bananas imported in 1970 rising to 168 000 tonnes in 1975) to which Somalia could reasonably regain access and expand its exports.

One of the factors contributing to the low profitability of bananas to the producers is the high fixed price of the locally manufactured cartons, which are 50% more expensive than imported cartons.

4.6 Grapefruit

Grapefruit production in Somalia is of minor importance, amounting to 2 000 to 4 000 tonnes per annum, all of which are for the domestic market. Small quantities of grapefruit were exported in the 1960s. The proposed scheme to grow grapefruit in the Study Area, to be financed by the EDF has been assigned about 1 400 ha; the fruit is to be grown for export. Under this scheme it is intended to sell the grapefruit on the European market, particularly in Italy (and possibly in the Middle East) during the period June to September, when supplies tend to be scarce. Southern African countries are the main suppliers at this time.

The Somali grapefruit have a poor appearance due to their rough skin, thus their entry into the highly competitive and brand conscious European market is likely to be difficult. It is considered than an investigation should be made into the slightly less selective Middle East market for future export possibilities. The world grapefruit market is fairly specialised with the USA and Israel sharing 70% of the world trade. Given this situation, a comprehensive market survey should be made before attempting to market grapefruit from Somalia.

4.7 Livestock

Livestock is the main source of employment income and the principal export earner in Somalia. In the Study Area, although significant, livestock are of secondary importance to crop production. Cattle are the most important livestock, accounting for 72% of the total stock population; small animals such as sheep and goats make up most of the balance. Production is mainly of milk, for household consumption, and secondly of meat. The live animal trade is minor compared with northern Somalia. It is estimated that 50% of the sheep and goats are slaughtered and consumed at home and that most of the cattle are sold for slaughter.

Although most purchases and sales are undertaken by the private sector, the Livestock Development Agency does a limited amount of trading through its controlled markets, buying for the state meat factory. Meat consumption is estimated to be low, at around 15 grammes per head per day; milk consumption is similarly low at 33 litres per head per annum. Although the survey carried out during the present study was limited in extent, it can be taken as an indication that there is considerable room for expansion of production and consumption of livestock products.

4.8 Prices

Market or financial prices for all the commodities are taken to be the same as the present Government controlled prices (where applicable). In no case is there a strong indication that the Government is likely to alter them in the near future. The prices for bananas and grapefruit are based on the current and future export price predictions whereas the prices for livestock are based on average market prices.

The economic prices have been calculated on the basis that maize, sesame, cotton and rice can be grown for import substitution. The long-run predicted price (1977 constant prices) is taken from World Bank estimates adjusted for delivery to the local market, usually Mogadishu. Grapefruit and livestock prices are taken as the market prices. The banana price is reduced, because of the uneconomic price that is currently paid for cartons, full details of which can be found in Appendix C.

The prices assumed for the subsequent analyses are listed in Table 4.1.

TABLE 4.1

Projected Prices of Crops and Livestock

Commodity	Financial market price	Economic price
Crops: (So.Shs./q)		
Maize	75	119
Sesame	240	250
Upland rice (60% milled basis)	350	338
Cotton	250	320
Pulses	100	125
Bananas (farm gate excl. packing)	50	71
Grapefruit	10	100
Livestock (So.Shs. per head)		
Cattle	900 - 950	900 - 950
Small stock	275 - 300	275 - 300
Milk (So.Shs./l)	0.60	0.60

CHAPTER 5

BASES FOR ECONOMIC EVALUATION

5.1 Cropping Patterns

The most important factors considered in the choice of crops to give the best financial return were the need:

(i) to provide adequate proportions of food crops in the rotation

(ii) to match labour requirements with supply

(iii) to take account of the water shortage periods of May to July

(iv) to endeavour to keep technological change to a minimum.

In addition, the criteria of soil suitability, markets and climate were considered. The possible alternative cropping patterns and the methods of selecting appropriate systems are discussed fully in Annex VI. The pattern finally selected is applicable to the majority of the Study Area, excluding the banana plantations and one or two specialised areas which will be discussed in Part IV.

The main crops selected are maize and sesame, the traditional crops of the area, with the addition of two cash crops, rice and cotton. A proportion of the small amount of rice already grown in the country is to be found in the Study Area: cotton was grown in the area when the irrigation systems were originally installed about 50 years ago. Cotton was discontinued, however, because of declining profitability and competition from bananas which were highly profitable.

The basic rotation includes a small area of forage, grown in the period of restricted water supply, to supplement the other livestock foods and to improve livestock production.

The proposed cropping pattern, as well as the present system, is shown in Table 5.1. It should be noted that these are shown per net cultivated area (NCA) and that the 140% intensity results in a greater total cultivated hectarage per year per household than before the proposed developments. This cropping pattern was adopted for the feasibility study in the Qoryooley area described in Part III. Variations from this basic cropping pattern within the Study Area are discussed in Part IV.

TABLE 5.1

Cropping Patterns

Stage of development	Crop	Intensity of cropping (%)		NCA (ha)	Total cultivation per year (ha)
		Crop	Total		
Before development	Maize	140			
	Sesame	66			
	TOTAL		206	2 227	4 588
After development	Maize	40			
	Rice	40			
	Cotton	35			
	Sesame	25			
	Forage	20			
	Household plots	6			
	TOTAL		166	4 200	6 972

5.2 Land Redistribution

The population of the Study Area is fairly dense at 167 people per km^2 but is moderately evenly distributed throughout the cultivated zone. The majority of families have rights to land and farm an average holding of 2.25 ha gross or 0.9 ha net cultivated. Holding sizes range from 0.2 to 13.0 ha but in half the villages surveyed no holding size was greater than 5 ha (Annex III, Chapter 5). In view of the relatively high density of population, the size of producer co-operatives, which it is proposed to establish as a result of Government policy, should be based on a ratio of 2 ha per family. The amount of land allotted to each family should be guided by the cropping pattern adopted, the labour requirement and the labour availability. The household labour availability is assumed to be two man equivalents permanently available plus some casual help from the women and children.

The banana plantations should be left as they are, as should the group of large farmers found in the Asayle area, chiefly because they would provide a diversity of farming system and thus could be a source of innovation. Also, they are to a large extent self-financing which reduces Government financial involvement and economises on scarce management ability which would otherwise be required.

There are few possibilities for increasing the total land area under cultivation because most of the suitable land is already cultivated and, more important, the water supplies are already severely limited. However, in areas which are likely to have a shortage of manpower, there is ample opportunity for immigration through the resettlement programme for the surplus semi-nomadic population.

A system of co-operatives is considered to be preferable to a farm system with its associated loss of identity for the work force, demand on specialised management, and probable over-mechanisation using scarce foreign exchange reserves. Nevertheless, it is anticipated that there could be some problems in redistributing the rights to land, despite the fact that the majority of the people would be better off under the proposed new system of cultivation.

5.3 Livestock

It is anticipated that the livestock holding of the average household would increase from 3.14 to 4.0 livestock units and would eventually comprise six cattle and two small stock (goats and sheep). Ownership and management of the livestock would remain with the household unit and the current uneven ownership patterns would probably persist. The proposed development would provide only infrastructural improvements and access to better animal food supplies and forage. Full details of the proposed developments are contained in Annex V.

5.4 Shadow Price of Labour

There has been considerable discussion (Annex IV, Appendix A) on the availability of labour in the Study Area, reiterated in Chapter 3 above. As a result of this discussion, in the economic analysis hired labour has been costed at only 50% of the market rate of So.Shs. 2.0/manhour. With the development proposed there is a minimal requirement for hired labour. Only hiring labour for bird scaring on the co-operatives is involved and consequently the actual rate adopted is of negligible significance to these projects. As regards the banana farmers and large farmers in the Asayle area, the problem is complicated by the localisation and seasonality of the demand for labour, combined with the apparent immobility of labour. It is clear, however, that the opportunity cost of labour in the area is low, as reflected by low incomes and some unemployment. Farmers could probably ease their labour problems by providing transport in the peak labour requirement seasons.

The 50% shadow wage rate of So.Shs. 1.0/manhour will be used for hired labour, as it has been adopted by other planners.A sensitivity analysis of this rate will be tested on the appropriate Master Plan projects excluding those areas adopting the smallholder cropping pattern.

The value of present production can be taken as not only the opportunity cost of land but also the opportunity of family labour.

5.5 Foreign Exchange

The Somali shilling is pegged to the US dollar; the present rate of 6.295 Somali shillings per US $ 1.0 has been in effect since 1972. As there is a considerable foreign exchange element in the development of this region (in terms of inputs and outputs) and as foreign exchange is scarce, it is appropriate to investigate the sensitivity of the currently proposed developments to changes in the foreign exchange rates, as well as looking at the total impact of these developments on the overall foreign exchange position.

There is evidence to suggest that the current fixed exchange rate considerably overvalues the Somali shilling, as demonstrated in the Livestock Sector Review (Hunting Technical Services, 1977). There are large illicit exchange markets in Jeddah, Djibouti and the Gulf, arising from the wish of Somalis working abroad to repatriate their money: the exchange rates vary between So.Shs. 12.0 and 15.0 to the US dollar. Other free markets exist in Djibouti and Jeddah, where livestock exporters buy cheap consumer goods to import into Somalia using hard currency earned from their exports. As this market appears to be large and relatively free it can be used to assess true exchange rates. The exchange rates are currently betwen So.Shs. 9.0 and 11.0 to the US dollar which represents an official overvaluation of 50 to 80% (Hunting Technical Services, 1977).

In the present study, a sensitivity analysis of an exchange rate reduced by 50% will be carried out. The need to make this analysis is because an overvalued domestic currency will understate the importance of the foreign exchange element in the project being assessed. The foreign exchange elements used throughout this analysis are shown in Tables 5.2 and 5.3.

TABLE 5.2

Foreign Exchange Element of Engineering Costs

Cost	Foreign exchange element (%)
Preparatory and survey work	60
Earthworks	45
Canal and drainage structures	55
Pump stations	75
Workshops	80
Stores, offices and houses	65
Electricity supply	80
Surfaced roads	50
Earth roads	40
Bush clearance and land levelling	50
Engineering and supervision	65
Communications systems	95
Lorries	80
All other vehicles	90

TABLE 5.3

Foreign Exchange Element of Crop Production Costs

Cost	Share of foreign exchange (%)	Share weighted by use in project (%)
Materials		
Seed	-	-
Fertilisers	70	-
Chemicals	70	-
Crops		
Cotton	-	69
Rice	-	56
Maize	-	68
Sesame	-	62
Forage	-	61
Machinery		
Capital	62.5	-
Repairs	40	-
Fuel	90	-
Tractor operations	-	50
Levelling	-	50
Combining	-	50
Total crop production costs by crops		
Cotton	-	58
Rice	-	44
Maize	-	60
Sesame	-	54
Forage	-	52

PART III

FEASIBILITY STUDY

CHAPTER 6

INTRODUCTION AND CONCLUSIONS

The feasibility studies of the Qoryooley project are described in this part of the annex. This project, which was selected for initial development, covers a gross area of some 5 800 ha lying on the right bank of the Shabeelle river between Gayweerow and Qoryooley villages. Smallholder agriculture is already established in the area, including varied intensities of irrigation farming; the net cropped area currently amounts to 2 227 ha. Present production features are assessed in Chapter 7.

The proposed development of the Qoryooley area has been based on the establishment of a pilot farm and eight village co-operatives, involving 2 089 families. The net cropped area is scheduled to rise to 3 963 ha. The traditional crops of maize and sesame would be grown, with production increasing by 4 500 and 245 tonnes, respectively. Cash crops of rice and cotton would be introduced to give outputs of 3 000 tonnes of milled rice and 3 400 tonnes of seed cotton. These development proposals are examined in Chapter 8, which deals with aspects not covered in Part II and provides a basis for valuation of the proposed agricultural production.

The capital costs of the proposed project are So.Shs. 90 million with a further investment of So.Shs. 10 million for agricultural machinery. Operation and maintenance charges amount to about So.Shs. 3 million per year. All farms are scheduled to be in production by year 7 and the full project output should be realised in year 14. The economic analysis shows an internal rate of return of 9.6%, which is considered to be reasonable for a fairly capital intensive agricultural project in Somalia. The foreign exchange flow is very favourable, giving a net present value of So.Shs. 68.5 million discounted at 10% over 30 years. At maturity the co-operative members would receive the proposed minimum annual income of So.Shs. 4 400 which represents twice their present income. Annual charges to cover operation and maintenance, amounting to So.Shs. 9.5 million, would be paid to the project authority by the village co-operatives, leaving about So.Shs. 6.0 million to cover annual servicing and repayment of capital debt.

CHAPTER 7

PRESENT PRODUCTION

7.1 Land Resources

The Qoryooley project covers a gross area of 5 800 ha; the net cropped area is 2 227 ha, of which 2 110 are currently irrigated. Land classification studies (Annex I) have shown almost 93% of the area to be suited to irrigation.

Although the majority (95%) of the net cropped area is irrigated (Table 7.1), the standards of irrigation are poor and quantities of water applied are inadequate. This is chiefly due to insufficient and intermittent water supplies, resulting from inefficient and intermittent water supplies, resulting from inefficient canals, low levels of management and inadequately levelled land. Over 90% of the gross area is commanded by the existing irrigation system but overall only 36% is actually irrigated. For the purposes of calculating the value of present production, the land has been divided into two categories, taking different yield levels for fully irrigated (Category 3) and for marginally irrigated (Category 2) annual cropped land (Appendix A and Annex IV).

TABLE 7.1

Present Land Use

Land use category	Net cropped area (ha)	Gross area (ha)
1. Uncultivated	-	120
2. Rainfed	117	333
Marginal irrigated	1 182	3 027
3. Irrigated annual	928	2 320
4. Irrigated perennial	-	-
Total irrigated	2 110	5 347
TOTAL	2 227	5 800

Some 88% of the gross area of the Qoryooley Project Area is irrigated (at some time or other) and included within the proposed development. However, this includes about 200 ha of land which, although it rates as unsuitable for irrigated agriculture (Class 6) due to high salinity and poor drainability (Annex I), is currently being irrigated and is within command of the main canals. This area is therefore retained within the development but provision is made for only a low level of capital works; split yield increases are to be expected from the general infrastructural improvements proposed.

7.2 Population

The present population is estimated to be 1 639 families with an average of 5.93 members each. This gives a total population of 9 719 people and an average of 1.39 net cultivated hectares per household. With the planned development it is estimated that 2 089 families could be accommodated in co-operatives, with 2 ha per household. The provision of these extra farm families should not pose a problem, families would become available from natural population increases and from the large village of Qoryooley (2 975 families) which lies adjacent to the Project Area (see Chapter 3 and Annex IV, Appendix A).

7.3 Livestock

The livestock numbers in the area are shown in Table 7.2; the methods of calculation are outlined in Chapter 3. The family unit has been taken as the basis for the estimation of livestock holdings and the valuation of present production will therefore be based on the future household population of the Project Area. The calculations are based on 2 089 families giving a livestock population of 7 312 cattle, 271 camels, 2 256 sheep and 418 goats. The estimated output of the livestock includes home consumption: it has been assumed that the costs are minimal. Although slightly inaccurate, it will not be an important source of error and will be offset by a similar calculation in the 'with project' situation.

TABLE 7.2

Livestock Numbers

	Total numbers
Household-families	1 639
Livestock	
Cattle	5 737
Camels	213
Sheep	1 770
Goats	328

Note: 3.14 livestock units per family

7.4 Value of Present Production

The gross and net values of present production (Table 7.3) are based on the findings of the 1977 survey (Appendix A). The detailed background and budgets are contained in Appendix B. The estimates are based on a cropping pattern of maize, 140%, sesame, 66%, and vegetables/pulses, 31%, of the net cropped area. All are partly intercropped and very low yields are obtained.

TABLE 7.3

Summary of Gross and Net Value of Present Production (Economic Prices)(1)

Costs and revenue items		('000 So. Shs.)
Net cropped area (ha)	2 227	
No. of households	1 639	
Revenue		
Maize		2 845
Sesame		1 148
Vegetables/pulses		86
Gross revenue		4 079
Direct Costs		
Land preparation		56
Maize: seed and labour		109
Sesame:seed and labour		43
Total Costs		208
Net Revenue		3 871
Household vegetables		272
Livestock(2)		1 338

Notes: (1) Economic prices for maize So. Shs. 119/q and for sesame So. Shs. 250/q. Labour shadow priced at 50%. Family labour not costed.

(2) Livestock output is for full population of 2 089 household-families as this would be the ultimate output lost.

The inputs costed for crops include seed, hired labour (family labour is costed at zero) and a small charge for land preparation.

It is considered that production will continue at the same level with unchanged yields in the 'without project' situation. The calculation of the value of present production from livestock is on a household basis, assuming firstly the number of households to be as at maturity of the project and secondly that the additional families will bring their livestock with them.

In terms of the implementation period and the stream of costs and benefits, the net value of present production from each area is charged as a cost one year before developments are completed, to allow for loss of production during the implementation period.

CHAPTER 8

VALUATION OF AGRICULTURAL PRODUCTION

8.1 Further Basis for Analysis

The basis for the economic analysis has been discussed in general terms in Chapter 5. Certain points however are particular to the Qoryooley project and need further emphasis here. The proposed cropping pattern as outlined in Chapter 5 is based on maize, sesame, cotton and rice. The proposed rate of development is high. Nevertheless it is considered to be feasible and desirable because of the disruption that would be caused. The longer the implementation period, the longer will be the disruption and hence the greater the loss of production. The pilot farm will be constructed in the first year and should be in operation by the end of that year. Work will later commence on the main canals and distributaries so that farms will come on stream at the rate of two every year, starting two years after the pilot farm is finished. Each farm area will be out of use for one year (because of development works) prior to being available under the new scheme. The development programme (summarised in Table 8.1) shows that by year 4, there will be over 1 000 ha developed and this will increase fairly rapidly over the succeeding four years. To achieve this rate of development will require considerable human and physical resources, not so much for the actual construction work as for the reorganisation of villages, the provision of inputs which are not readily available at present such as fertilisers and machinery, and for the dissemination of expertise and experience gained from the pilot farm.

Although the majority of those already farming in the area do so as individuals, there is already considerable experience of co-operatives particularly where local people have taken over former banana farms and operated them on a co-operative basis. Although this should help in the change to co-operative farming, the difficulties likely to be encountered should not be underestimated.

8.2 Valuation of Agricultural Production

The valuation of agricultural production is based on the farm costs and returns, which are detailed in Annex II and discussed in terms of inputs and their proposed level of use. The proposed implementation programme, summarised in Table 8.1, is fully discussed in Annexes VII and IX. It is considered that it will take eight years after development of a farm for the crops to attain their full yield potential. With farms being developed over six years, the project output will eventually stabilise by year 14. Table 8.2 shows the increase in yields over the eight year period. Sesame and maize yields start at 5 and 18 q/ha, respectively, (both starting higher than at present due to the immediate improvement in irrigation methods) rising to 10 and 40 q/ha at project maturity. Rice and cotton are shown to rise from 16 and 10 q/ha to 30 and 25 q/ha, respectively.

The present crop budgets are shown in Table 8.3 and summaries of direct costs and crop budgets at project maturity are given in Tables 8.4 and 8.5. Livestock budgets are given in Table 8.6. Further details can be found in Appendix B.

TABLE 8.1

Implementation Programme

Village name	NCA before	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	On completion of project NCA[1]	On completion of project NCA all crops
Pilot farm	82								137	128
Tawakal	302								533.5	499.5
Murale	220								369.5	345.5
Garas Guul	296								529.5	495.5
Shamaan	234								415	389
Tugarey	195								482	451
Nimcooley	302								263 + (207[1])	246
Gayweerow	274								611	572
Jasiira	322								623	584
Total available at beginning of year[1]			137	137	1 040	1 984.5	2 729.5 207[2]	3 963.5 207[2]		
Total (without houseplots)			128	128	973	1 857.5	2 554.5	3 710.5		

Line indicates period when land will be out of production. Loss of production on existing land considered from beginning of line.

Notes: (1) Includes household plots
(2) Class 6 land excluded from basic project but provision made for some upgrading.

Notes on the cropping pattern and yields can be found in Appendix B.
NCA = Net cultivated area in hectares.

TABLE 8.2

Build-up of Yields (q/ha)

Crop	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Upland rice								
Unmilled	16	19	22	25	27	28	29	30
Milled	10.4	12.4	14.3	16.25	17.55	18.2	18.9	19.5
Cotton	10	13	17	20	22	23	24	25
Maize	18	23	29	35	37	38	39	40
Sesame	5.0	6.0	7.0	8.0	9.5	9.0	9.5	10.0
Mixed forage (t/ha)	65	65	65	65	65	65	65	65

Note: Years 1, 4 and 8 chosen as years for yield estimates

TABLE 8.3

Present Budgets

	Crops[1] (So.Shs./ha)					
	Maize		Sesame		Pulse	
Land use category[2]	2	3	2	3	2 & 3	
Yield (q/ha)	6	10	2.5	4	1	
Financial Prices						
Price (So.Shs./q)	75		240		100	
Revenue/ha	450	750	600	960	100	
Costs/ha	80	80	72	72	-	
Net revenue/ha	370	670	528	888	100	
Economic Prices						
Price (So.Shs./q)	119		250		125	
Revenue/ha	714	1 190	625	1 100	125	
Costs/ha	60	60	54.5	54.5	-	
Net revenue/ha	654	1 130	570.5	945.5	125	

	Livestock (So.Shs./100 families)		
	Value	No.	Total
Cattle			
Milk (litres)	2	20 520	41 040
Offtake	800	25	20 000
Small stock			
Home consumption	250	6	1 500
Sales	250	6	1 500
Net revenue[3]			64 040

Notes: (1) See Appendix B for full summary of costs

(2) Land use category refers to incremental yield potential
Class 2 - Marginal annual crop production
Class 3 - Irrigated annual crop production

(3) Other than grazing and consuming crop residues, allowance is made for a few supplementary concentrates. This is allowed for in the 'with project' situation.

TABLE 8.4

Direct Crop Production Costs at Maturity (Year 8) (So. Shs./ha)

Crop	Materials[1]	Machinery	Labour[2]	Drying,[3] transport etc.	Total	Foreign exchange (%)
Financial prices						
Upland rice	1 154.15	702.8	420	198	2 474.95	
Cotton	1 332.45	497.9	-	168	1 998.35	
Sesame	176.05	323.8	-	-	499.85	
Maize	599.55	409.7	-	168.05	1 177.30	
Mixed forage	304.80	1 076.30 671.00[4]	(748)	-	1 381.10 975.8	
Economic prices						
Upland rice	1 172.96	588.80	210	189	2 160.76	44
Cotton	1 377.71	422.60		144	1 944.31	58
Sesame	188.71	269.90			458.61	54
Maize	645.28	344.30		151.5	1 141.08	60
Mixed forage	327.26	914.90 567.50[4]	(374)		1 242.16 894.76	52

Notes: (1) Years 1 to 4 have different input levels.

(2) Hired labour is only for bird scaring. Shadow wages of 50% have been taken as large numbers are required despite the fact that the workers are women and children.

(3) Cost dependent on yield.

(4) Tractor work reduced under the livestock improvement programme.

TABLE 8.5

Summary of Crop Budgets at Maturity (So. Shs./ha)

Crop	Yield (q/ha)	Economic Prices: Price (So.Shs./q)	Economic Prices: Gross revenue	Economic Prices: Costs	Economic Prices: Gross margin	Financial Prices: Price (So.Shs./q)	Financial Prices: Gross revenue	Financial Prices: Costs	Financial Prices: Net revenue
Upland rice(1)	19.5	338	6 591	2 161	4 430	350	6 825	2 475	4 350
Cotton	25	320	8 000	1 920	6 080	250	6 250	1 970	4 280
Sesame	10	250	2 500	459	2 041	240	2 400	500	1 900
Maize	40	119	4 760	1 111	3 649	75	3 000	1 144	1 856
Mixed forage									
(A)	65 t/ha			1 242				1 380	
(B)	65t/ha			895				976	

Notes: See Appendix B for details of development in Nimcooley.

(1) Milled rice basis, 65%

(A) For pilot farm

(B) For livestock improvement programme.

TABLE 8.6

Summary of Livestock Budget at Maturity (So.Shs./100 household families)

Returns		Value	No.	Total
Cattle				
Milk		2	46 400	92 800
Offtake		900	53	47 700
Small stock				
Home consumption		260	10	2 600
Sales		275	16	4 400
				147 500
Economic Prices				
	Costs			31 260
	Net revenue			116 240
Financial Prices	Costs			33 780
	Net Revenue			113 720

CHAPTER 9

ECONOMIC ANALYSIS

9.1 Project Costs

The implementation of the project is scheduled to be completed by the end of year 6, costing about So. Shs. 90 million over this period. Fifty per cent of this cost, however, will be spent in the first two years, mainly because of the need to purchase most of the plant at the outset. Over 70% of the costs are for engineering with about 22% for buildings and the balance for vehicles. After year 6 the capital costs are for replacement of plant and machinery only. The engineering costs are summarised in Tables 9.1 and 9.2; full details are given in Annex VII.

The operation and maintenance charges rise to So. Shs. 1.5 million by year 7 when the project has been fully implemented. The annual cost of headquarters staff, which includes all the salaried staff on the pilot farm as well as the administration personnel at headquarters, rises to a peak of So. Shs. 2.1 million from year 4 to year 7 after which it falls to under So. Shs. 1 million by year 9 when all the expatriate staff will have left the project. Total costs, including farm staff employed in the villages, reduce to about So. Shs. 4.0 million per annum by year 7.

The foreign exchange element in the capital costs is So. Shs. 51 million representing 57% of the total. The foreign exchange element in the costs after implementation varies between So. Shs. 1.0 and 2.5 million.

The capital costs do not include the purchase of farm machinery which the co-operatives will obtain through the state organisation, ONAT, on loan terms. The purchase costs are included as an annual capital charge in the machinery costs. Financing in the order of So. Shs. 10 million will be required for all the machinery over the first six years of implementation.

9.2 Alternative Water Supply from the Asayle Canal

The Qoryooley system is designed to take water from the River Shabeelle just upstream of the Gayweerow barrage. For most of the Qoryooley area, water has to be pumped against a low head averaging 2 m. An alternative system has been considered whereby about half the area is fed from the Asayle canal and under this arrangement about half of the area can be fed by gravity. However the earthworks of the Tawakal branch canal are greatly increased in this alternative.

This new system would also benefit the Asayle project area because of the effect of remodelling the Asayle canals. To make the comparison of alternatives, the cost of reconstructing the Asayle canal for the Asayle area alone is deducted from the total cost of the gravity supply alternative. The capital costs were estimated to be So. Shs. 8 million extra, less the estimated cost of construction of the canal for Asayle only (So. Shs. 2.2 million) and the operation and maintenance charges of So. Shs. 1.53 million against So. Shs. 1.55 for the basic scheme. The comparison of the cash flows is summarised in Table 9.4 and detailed in Appendix D. A full analysis was carried out on this option but only the basic scheme has been assumed for the feasibility study for the Qoryooley project.

Engineering Capital Costs Summary (000 So. Shs.)

	Pilot farm contract		Tawakal contract		Gayweerow contract		Total for each bill	
	Total cost	Foreign exchange	Total cost	Foreign exchange	Total cost	Foreign exchange	Total cost	Foreign exchange
Normal water supply system from Gayweerow barrage								
Land preparation	620	310	10 762	5 381	7 041	3 521	18 423	9 212
Earthworks	149	67	7 800	3 510	5 218	2 348	13 167	5 925
Canal structures	375	206	8 049	4 427	5 825	3 203	14 249	7 836
Drain structures	-	-	2 079	1 143	947	521	3 026	1 664
Pump stations	-	-	3 528	1 940	1 630	897	5 158	2 837
In-field structures and equipment	96	53	1 113	612	713	392	1 922	1 057
Surfaced roads	2 041	1 123	-	-	-	-	2 041	1 123
Buildings	8 060	5 241	7 361	4 785	4 562	2 966	19 986	12 992
Services	1 922	1 548	1 991	1 487	949	685	4 862	3 720
Engineering	1 134	737	4 070	2 646	2 594	1 686	7 798	5 069
TOTAL	14 400	9 285	46 751	25 931	29 479	16 219	90 630	51 435
Alternative water supply system with the Asayle canal feeding the Tawakal branch canal								
Land preparation	620	310	10 866	5 433	7 041	3 521	18 527	9 264
Earthworks	149	67	12 564	5 654	5 578	2 510	18 291	8 231
Canal structures	375	206	10 946	6 020	5 962	3 279	17 283	9 505
Drain structures	-	-	2 079	1 143	947	521	3 026	1 664
Pump stations	-	-	2 027	1 115	1 630	897	3 657	2 012
In-field structures and equipment	96	53	1 113	612	713	392	1 922	1 057
Surfaced roads	2 041	1 123	-	-	-	-	2 041	1 123
Buildings	8 063	5 241	7 361	4 785	4 562	2 966	19 986	12 992
Services	1 922	1 548	1 991	1 487	1 582	1 145	5 495	4 180
Engineering	1 134	737	4 696	3 052	2 643	1 718	8 473	5 507
TOTAL	14 400	9 285	53 642	29 301	30 658	16 949	98 700	55 535

TABLE 9.2

Engineering Operation and Maintenance Costs Summary ('000 So.Shs.)

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6 onwards
Normal water supply system solely from Gayweerow barrage							
Earthworks	-	28.0	28.0	117.9	135.1	188.7	209.9
Canal and drain structures	-	0.4	0.4	5.2	11.5	14.7	33.1
Pump stations	-	-	-	169.4	218.7	289.7	340.8
In-field structures and equipment	-	5.9	5.9	36.9	56.3	78.0	104.6
Surfaced road	-	40.8	40.8	40.8	40.8	40.8	40.8
Buildings	-	161.3	161.3	249.6	308.5	369.3	399.7
Services	41.5	188.5	200.5	303.6	348.9	399.0	419.9
TOTAL	41.5	424.9	436.9	923.4	1 119.8	1 380.2	1 548.8
Foreign exchange component	27.6	271.1	279.1	590.8	716.0	881.6	987.3
Alternative water supply system with the Asayle canal feeding the Tawakal branch canal							
Earthworks	-	28.0	28.0	124.8	142.0	252.8	276.5
Canal and drain structures	-	0.4	0.4	5.2	11.5	14.7	33.1
Pump stations	-	-	-	113.0	133.3	204.1	255.4
In-field structures and equipment	-	5.9	5.9	36.9	56.3	78.0	104.6
Surfaced road	-	40.8	40.8	40.8	40.8	40.8	40.8
Buildings	-	161.3	161.3	249.6	308.5	369.3	399.7
Services	41.5	188.5	200.5	303.6	348.9	399.0	419.9
TOTAL	41.5	424.9	436.9	873.9	1 041.3	1 358.7	1 530.0
Foreign exchange component	27.6	271.1	278.9	556.4	662.5	861.8	968.2

9.3 Benefits

The project has three main components; first, the establishment of a pilot farm primarily to train staff but also to carry out research and to provide extension services to the main co-operative farms. Second, there is the development of higher output from land and third, there will be the improvement of livestock in the area. The benefits of the pilot farm will be realised mainly through the crop and livestock components of the scheme. In addition, it is anticipated that some benefits will be felt outside the Project Area.

The output of crops will increase by 4 500 tonnes for maize, 245 tonnes for sesame, 3 400 tonnes for cotton and 3 000 tonnes for milled rice with an increase in gross margin of So. Shs. 6.6 million for rice, So. Shs. 8.3 million for cotton, So. Shs. 0.9 million for sesame and So. Shs. 3.0 million for maize. This is shown in Table 9.3 which summarises the impact of the project at maturity (14 years). Production from household plots has been included and shows an increase of So. Shs. 49 000 after the project is developed. The gross margin per hectare will rise from about So. Shs. 1 000 to So. Shs. 5 600. The increase in livestock gross margins is more modest and is estimated to increase from about So. Shs. 1.3 million to So. Shs. 2.3 million. The total gross margin of So. Shs. 25 million has to be shared between the direct project costs, increased income for the co-operative members and a contribution to servicing the capital invested. The financial aspects of the project are discussed fully in Chapter 10.

All farms are scheduled to be in production by year 7 and full project output is realised by year 14. The first benefits from the pilot farm will accrue in year 2 and the main areas will start contributions to production from year 4.

In Appendix D the complete cash flows are given, covering a life of the project of 30 years. A salvage value of the scheme at So. Shs. 60 million is included to avoid the possibility of not fully representing the benefits. At the higher discount rates the impact of the salvage value is negligible. The cash flows include revenue and costs for the 'with project' and 'without project' situation.

9.4 Cash Flows

Eight full cash flows have been calculated and are presented in Appendix D. Six of these are concerned with the effect of the project on the national economy and the other two present the financial status of the project. The following cash flows have been prepared :-

(a) Project analysis at economic prices deriving the internal rate of return.

(b) Effect on the project of reducing output by 20%.

(c) Effect on the project of the construction costs increasing by 20%.

(d) Effect on the project of up-valuing the foreign exchange element by 50%.

(e) Analysis of the foreign exchange flows associated with the project.

TABLE 9.3

Value of Production 'With' and 'Without' Project at Maturity
(Economic prices '000 So. Shs.)

	Rice	Cotton	Sesame	Maize	Household plots	Total without livestock	Livestock	Total
With Project								
Cropped area(ha)	1 493	1 363	992	1 565	253			
Price	338	320	250	119				
Gross revenue	9 840	10 904	2 454	7 449	679(1)	31 326	3 244	
							88(2)	
Direct costs	3 226	2 617	447	1 738		8 028	940	
							28(2)	
Gross margin	6 614	8 287	2 007	5 711	679	23 298	2 364	25 662
						(So. Shs. 5 586/ha NCA)(3)		
Without Project								
		Pulses						
Cropped area (ha)			2 264	2 190				
Price		100	250	119				
Gross revenue		86	1 148	2 845	230	4 309	1 338	5 647
Direct costs		General (56)	43	109		208		208
Gross margin		(30)	1 105	2 736		4 101	1 338	5 439
Net incremental benefit			902	2 975		19 197	1 026	20 223
						(So. Shs. 4 603/ha NCA)(3)		

Notes: (1) Includes 8 for vegetables on Nimcooley farm
(2) Poultry programme
(3) Rates/ha based on NCA 4 170.5 ha

(f) Effect on the project of an alternative method of water supply for some of the Project Area.

(g) Analysis of the financial status of the project and the effects of charges.

(h) Financial cash flow of the project.

A summary of the cash flows is given in Tables 9.5 and 9.6.

9.5 Internal Economic Rates of Return

The internal economic rates of return for the project have been calculated under the assumptions shown in Section 9.3 from the cash flows in Table 9.6. The rates of return are summarised in Table 9.4 showing the difference between including or excluding the salvage value of the project. At the higher rates of return, the effects of salvage value are relatively insignificant and all the basic calculations have been done including the salvage value, as the project works will be as utilisable as from the beginning of the scheme. The effects of changes in the capital costs and output are illustrated.

TABLE 9.4

Rates of Return on Investment

	IRR(1)	IRR(2)	% Difference over from basic analysis
Basic analysis	9.2	9.6	0
Project with 20% drop in output	3.8	5.1	-4.5
Project with 20% increase in investment costs	7.7	8.2	-1.4
Project with foreign exchange shadow priced up 50%	12.2	12.4	+2.8
Asayle option for water supply	8.7	9.2	-0.4

Notes : (1) No salvage value
(2) With salvage value (So. Shs. 60 million)

The basic analysis gives an internal rate of return of 9.6% which although not highly attractive to lending agencies is a reasonable return for an agricultural project in Somalia. The project, not unnaturally, shows a high sensitivity to a fall in output (4.5 percentage points for a 20% drop in output).

TABLE 9.5

Summary of Cash Flow of Qoryooley Project (So. Shs. million)

Year	Net revenue 'with' project	Net revenue 'without' project	Net benefit	Project costs	Net cash flow
1	-(1)	0.19	-0.19	19.49	-19.69
2	0.12	0.24	-0.12	28.80	-28.92
3	0.35	1.24	-0.89	11.64	-12.53
4	2.90	2.39	0.51	19.94	-19.43
5	6.05	3.74	2.31	15.60	-13.29
6	10.15	5.14	5.01	11.27	- 6.27
7	17.20	5.44	11.76	4.60	7.17
8	18.24	5.44	12.80	3.80	9.00
9	20.79	5.44	15.35	4.05	11.29
10	22.61	5.44	17.17	3.68	13.50
11	23.75	5.44	18.31	3.85	14.46
12	24.48	5.44	19.05	4.09	14.96
13	24.99	5.44	19.55	3.12	16.43
14	25.23	5.44	19.79	5.18	14.61
15	25.23	5.44	19.79	3.90	15.89
16	25.23	5.44	19.79	4.16	15.64
17	25.23	5.44	19.79	4.08	15.71
18	25.23	5.44	19.79	3.31	16.48
19	25.23	5.44	19.79	3.89	15.90
20	25.23	5.44	19.79	3.80	16.00
21	25.23	5.44	19.79	3.79	16.00
22	25.23	5.44	19.79	3.78	16.01
23	25.23	5.44	19.79	3.12	16.67
24	25.23	5.44	19.79	3.90	15.89
25	25.23	5.44	19.79	4.12	15.67
26	25.23	5.44	19.79	4.34	15.45
27	25.23	5.44	19.79	3.92	15.87
28	25.23	5.44	19.79	3.43	16.36
29	25.23	5.44	19.79	3.83	15.96
30	25.23	5.44	19.79	3.49	16.30
Salvage			60.00		60.00

Net present value at 8% 17.85
10% -3.71

Internal rate of return 9.6%

Note: Figures will not always agree because of rounding

(1) Each area of land is taken out of production one year before completion of development to allow for field work.

TABLE 9.6

Summary of Economic Cash Flows (So. Shs. million)

Year	Basic assumption	Output 20% down	Construction 20% up	Foreign exchange shadow price (+ 50%)	Foreign exchange flow	Asayle option
1	-19.69	-19.96	-23.31	-25.79	-12.20	-19.96
2	-28.92	-29.04	-34.28	-37.07	-15.66	-31.24
3	-12.53	-12.72	-14.40	-16.00	- 6.95	-13.47
4	-19.43	-20.60	-22.78	-23.89	- 8.94	-20.62
5	-13.29	-15.45	-15.70	-15.18	3.81	-13.98
6	- 6.27	- 9.61	- 7.74	- 5.25	1.99	- 6.54
7	7.17	2.03	7.10	14.92	13.45	7.19
8	9.00	3.62	9.00	16.46	14.87	9.02
9	11.29	5.38	11.20	20.01	17.39	11.59
10	13.50	7.19	13.38	23.32	19.61	13.69
11	14.46	7.91	14.32	24.80	20.65	14.48
12	14.96	8.26	14.77	25.57	21.18	14.98
13	16.43	9.62	16.43	27.73	22.56	16.45
14	14.61	7.75	14.20	25.10	20.95	15.18
15	15.89	9.04	15.74	26.96	22.10	16.27
16	15.64	8.78	15.43	26.59	21.87	15.08
17	15.71	8.85	15.52	26.69	21.94	15.73
18	16.48	9.62	16.44	27.81	22.63	16.50
19	15.90	9.05	15.75	26.98	22.11	16.20
20	16.00	9.14	15.86	27.11	22.20	16.20
21	16.00	9.14	15.87	27.12	22.20	16.02
22	16.01	9.15	15.88	27.13	22.21	16.03
23	16.67	9.81	16.67	28.09	22.80	16.69
24	15.89	9.04	14.20	25.10	20.95	15.18
25	15.67	8.82	15.47	26.64	21.90	16.05
26	15.45	8.39	15.20	26.32	21.70	14.89
27	15.87	9.02	15.71	26.93	22.08	15.89
28	16.36	9.51	16.30	27.64	22.53	16.38
29	15.96	9.10	15.81	27.05	22.16	16.25
30	16.30	9.44	16.23	27.55	22.47	16.50
Salvage	60.00	60.00	60.00	60.00	60.00	60.00

The effect of an increase of 20% in the investment costs is to lower the rate of return by 1.4 percentage points which is not a very significant change. The low sensitivity to a change in investment costs is a useful attribute as these costs have a tendency to rise. The advantage of this is illustrated by the change in the return due to taking the Asayle option, in which the increased costs result in an insignificant change in the rate of return. The implications are that the Government is relatively free to choose which alternative would suit them best.

The effect of applying a shadow price of 50% to foreign exchange is to raise the rate of return by nearly three percentage points, which reflects the favourable exchange flow (Table 9.5), under which the cash flow becomes positive by year 5.

Table 9.4 gives a basis for comparing this project with other projects, especially in the Lower Shabeelle region.

9.6 Net Present Values

Direct comparison of the internal economic rate of return of mutually exclusive projects or forms of the same project can lead to an incorrect investment decision. Normally it is satisfactory to make the choice on the basis of the net present value of the alternatives, discounted at the opportunity cost of capital within the country. Table 9.7 shows the net present value at 10%, the accepted level within Somalia, as well as at 8% and 12% for comparison, for each of the economic analyses shown in Appendix D.

TABLE 9.7

Comparison of Net Present Values for Differing Discount Rates (So. Shs. million)

	Discount rate		
	8%	10%	12%
Basic analysis	17.8	- 3.7	-17.8
20% fall in output	-29.5	-40.7	-46.9
20% increase in capital costs	2.2	-18.2	-33.5
50% shadow price for foreign exchange	65.2	28.2	3.4
Asayle option for water supply	14.6	- 7.5	21.5
Foreing exchange flow	105.6	68.5	48.5

9.7 Asayle Option

The economic analysis in the previous sections gives a slightly higher rate of return for the Asayle option as compared with the basic scheme but at a 9% discount rate, the net present values of the two alternatives are :-

	So. Shs.
Basic scheme	5 931 000
Asayle option	2 072 000

Although the basic scheme is economically more favourable than the Asayle option there are other factors, such as ease of maintenance, which are important. Furthermore, the extra cost would be low and, given the margin of error which is likely to be contained within the data, it would probably be insignificant.

CHAPTER 10

FINANCIAL ANALYSIS

10.1 Introduction

The financial analysis is carried out using financial or market prices. The object of the analysis is to investigate the income and financial status of the co-operative member, the financial position of the village co-operative and finally the expenditure and possible receipts of the project authority.

10.2 Farm Budgets

Table 10.1 gives the present farm budget of an average household in the Project Area. There is naturally, however, a range in income depending on farm size and land potential. To calculate present production, two levels of yield were taken, as detailed in Chapters 5 and 7. Under present conditions, the average smallholder income is So.Shs. 2 390 or 1 770/ha, being derived from maize, sesame, some pulses, vegetables and, in some cases, livestock. The range in income is accentuated by uneven livestock holdings, over 50% of households possessing none.

Table 10.2 shows that with the project the total net annual revenue per household would amount to So.Shs. 9 757. This would have to provide an income to the households and cover a contribution to the village co-operative running costs. The balance would be available for repayment to the project authority to meet capital development and project operating and maintenance costs. Although the average net revenue at maturity includes livestock revenue, which is not distributed equally amongst the households, it is likely that after development of the project the increase in family income would eventually lead to a more equitable distribution of livestock holdings.

10.3 Target Income

A target annual income of So.Shs. 4 400 per household is proposed, based on the recommendations of an ILO study (1976). It should be noted that this income is nearly twice the present average household income. When calculating the household income the returns from livestock and the household plots will be taken into account.

TABLE 10.1

Household Farm Budget under Existing Agriculture (1), (2) (So. Shs.)

	Intensity (%)	Price (So. Shs./q)	Yield (q/ha) Class 2	Yield (q/ha) Class 3	Gross revenue Class 2	Gross revenue Class 3	Farm costs(3)	Gross margin Class 2	Gross margin Class 3
Maize	140	75	6	10	850.5	1 417.5	151.2	699.3	1 266.3
Sesame	66	240	2.5	4	534.6	855.4	64.1	470.5	791.3
Pulses (3)	31	100	1	1	41.9			41.9	
Total gross margin								1 211.7	2 099.5
Average gross margin (58% class 2, 42% class 3) (4)								1 584.6	
Estimated benefit from vegetables								165.0	
Crop income								1 749.6	
Revenue from livestock								640.0	
Total income								2 389.6	

Notes: Figures only valid on an average basis.
(1) Area farmed 1.35 ha.
(2) Class 2 and class 3: marginal and irrigated annual production, respectively.
(3) Excluding family labour.
(4) Seed allowed for; no other cost involved.

TABLE 10.2

Household Farm Budgets at Maturity
(Financial Prices So.Shs.)

Crop	Intensity (%)	Gross revenue	Production costs	Net revenue
Maize	40	2 244.0	880.6	1 363.4
Rice	40	5 105.1	1 851.3	3 253.8
Cotton	35	4 091.6	1 307.9	2 783.7
Sesame	25	1 122.0	233.7	888.3
				8 289.2
Household plots				331.0
Livestock		1 475.0	337.8	1 137.2
Net revenue per household:				
with livestock				9 757.4
without livestock				8 617.2
Net revenue per hectare:				
with livestock				4 878.7
without livestock				4 308.6

Notes: 1. Area per household comprises 1.87 ha annual crops and 0.13 ha household (vegetable) plots.

2. Household farm budget as part of co-operative.

10.4 Family Income and Project Repayment

To achieve the target family income of So.Shs. 4 400, it is envisaged that livestock and household plots will provide So.Shs. 1 428 (on average), leaving So.Shs. 2 972 to be distributed from the village co-operatives. The co-operatives will receive So.Shs. 16.78 million in total crop gross margin from which the direct co-operative staff costs and capital servicing charges of So.Shs. 1.06 million must be deducted (Table 10.3) leaving So.Shs. 15.72 million or So.Shs. 7 523 per household for distribution. Table 10.3 shows that the village co-operative farms have a combined repayment capacity of So.Shs. 9.5 million and that the sum available for distribution amongst the co-operative members is So.Shs. 6.21 million or So.Shs. 2 972 per household. With an average family income of So.Shs. 5 400 the minimum income that a household without livestock will receive is So.Shs. 3 240.

TABLE 10.3

Summary of Family Income and Repayment Capacity (So.Shs.)

		per hectare	per household	Total ('000 So.Shs.)
(a) Village farms gross margin		4 016	8 033	16 780
(b) Village co-operative costs:				
Salaries	572 000			
Interest on working capital @ 10%	492 000	255	509	1 064
(c) Revenue for disposal		3 762	7 523	15 716
(d) Target income (excluding returns from livestock and household plots)		1 486	2 972	6 208
(e) Repayment capacity from farms (c minus d)		2 276	4 552	9 508
Distribution to members (a minus e) minus b		1 486	2 972	6 208
Plus livestock and household plot returns		714	1 428	2 983
TOTAL household income		2 200	4 400	9 191

The introduction of project charges must ensure that the household income does not fall below present average income levels. The following proposed scale of repayments ensures this.

	Year of development							
	1	2	3	4	5	6	7	8
Repayment/ household	0	1 000	2 000	3 000	3 400	3 800	4 200	4 552
Average household income	2 912	3 264	3 774	3 932	4 334	4 352	4 370	4 400

The results of the build-up of these repayments are shown in Appendix D as the cash flow to the project authority. This is summarised in Table 10.4 which indicates that the project authority cash flow becomes positive in year 8, and provides an average of So.Shs. 5.7 million annual surplus over operation and maintenance costs to service and repay capital after year 13.

The total negative cash flow of the first seven years amounts to So.Shs. 106 million. The project would be able to repay a loan of this amount at only 3% over 47 years.

10.5 Charges

Charges will be levied on the village farms by the project authority. These charges could be raised as payments per hectare, per quintal of output or as a combination of both. The advantage of the per hectare basis is that the amount due is known in advance which assists forward planning, but it can be very difficult to collect in years of low yields. Conversely, the per quintal payment can reduce returns to the authority, as well as possibly being a disincentive to increased productivity. It is suggested that a combination of the two levies might be a reasonable compromise. The final choice of method of charging will rest with the implementing authority and the Government.

TABLE 10.4

Cash Flow to Project Authority
(Financial Prices - So.Shs. million)

Year	Net crop revenue	Farm costs	Net revenue	HQ charges	Project costs	Net project cash flow
1	-	-	-	-	19.49	-19.49
2	0.24	0.01	0.23	-	28.80	-28.80
3	0.25	0.01	0.24	-	11.64	-11.64
4	1.49	0.30	1.19	-	19.94	-19.94
5	4.31	0.57	3.74	0.62	15.60	-14.99
6	5.68	0.81	4.88	1.66	11.27	- 9.61
7	8.87	1.06	7.80	3.19	4.60	- 1.41
8	11.24	1.06	10.18	4.78	3.80	0.98
9	13.15	1.06	12.09	6.16	4.05	2.11
10	14.46	1.06	13.40	7.37	3.68	3.69
11	15.54	1.06	14.47	8.26	3.85	4.41
12	16.14	1.06	15.07	8.89	4.09	4.80
13	16.57	1.06	15.50	9.32	3.12	6.19
14	16.78	1.06	15.72	9.51	5.18	4.32
15	16.78	1.06	15.72	9.51	3.90	5.60
16	16.78	1.06	15.72	9.51	4.16	5.35
17	16.78	1.06	15.72	9.51	4.08	5.93
18	16.78	1.06	15.72	9.51	3.31	6.20
19	16.78	1.06	15.72	9.51	3.89	5.62
20	16.78	1.06	15.72	9.51	3.80	5.71
21	16.78	1.06	15.72	9.51	3.79	5.72
22	16.78	1.06	15.72	9.51	3.78	5.73
23	16.78	1.06	15.72	9.51	3.12	6.39
24	16.78	1.06	15.72	9.51	3.90	5.61
25	16.78	1.06	15.72	9.51	4.12	5.49
26	16.78	1.06	15.72	9.51	4.34	5.16
27	16.78	1.06	15.72	9.51	3.92	5.59
28	16.78	1.06	15.72	9.51	3.43	6.08
29	16.78	1.06	15.72	9.51	3.83	5.67
30	16.78	1.06	15.72	9.51	3.49	6.02

The method of distribution of the returns to households will rest with the project authority but it will be essential that part of the distribution includes an allocation of maize and sesame for home consumption.

As livestock are unevenly distributed amongst households, a system of charging for the forage will need to be instigated from the village co-operative. Also, as non-livestock farmers will be encouraged to grow forage, a transfer payment should be made to non-livestock farmers from livestock farmers to cover the value of their labour in producing this forage. This charge would be So.Shs. 748/ha of forage grown with labour charged at So.Shs. 2.0/manhour.

10.6 Internal Financial Rate of Return

The project financial cash flow is detailed in Appendix D, and summarised in Table 10.5. The internal financial rate of return on all resources is 7%.

TABLE 10.5

Project Financial Cash Flow (So. Shs. million)

Year	Net revenue with project	Net revenue without project	Net benefit	Project costs	Net cash flow
1	-	0.14	-0.14	19.49	-19.63
2	0.02	0.18	-0.16	28.80	-28.95
3	0.24	0.86	-0.62	11.64	-12.26
4	1.99	1.78	0.21	19.94	-19.73
5	4.34	2.81	1.53	15.60	-14.07
6	7.35	3.89	3.46	11.27	- 7.81
7	11.22	4.19	7.04	4.60	2.44
8	13.90	4.19	9.72	3.80	5.92
9	16.01	4.19	11.83	4.05	7.78
10	17.54	4.19	13.36	3.68	9.68
11	18.53	4.19	14.34	3.85	10.50
12	19.13	4.19	14.94	4.09	10.86
13	19.56	4.19	15.37	3.12	12.25
14	19.76	4.19	15.58	5.18	10.40
15	19.76	4.19	15.58	3.90	11.68
16	19.76	4.19	15.58	4.16	11.42
17	19.76	4.19	15.58	4.08	11.50
18	19.76	4.19	15.58	3.31	12.27
19	19.76	4.19	15.58	3.89	11.69
20	19.76	4.19	15.58	3.80	11.78
21	19.76	4.19	15.58	3.79	11.79
22	19.76	4.19	15.58	3.78	11.80
23	19.76	4.19	15.58	3.12	12.46
24	19.76	4.19	15.58	3.90	11.68
25	19.76	4.19	15.58	4.12	11.50
26	19.76	4.19	15.58	4.34	11.23
27	19.76	4.19	15.58	3.92	11.66
28	19.76	4.19	15.58	3.43	12.15
29	19.76	4.19	15.58	3.83	11.74
30	19.76	4.19	15.58	3.49	12.09
Salvage			60		60

PART IV

MASTER PLAN

CHAPTER 11

INTRODUCTION

11.1 Objectives

Master Planning studies were carried out for the whole Study Area (Figure 11.1). This area covers 67 400 ha, of which about 20 800 ha are already irrigated, and includes a population of about 112 000, comprising 18 940 family units.

A complete description of the Master Plan proposals is contained in Annex VI. Part IV of this annex is confined to establishing the current levels of production, identification of possible development alternatives, testing the social and economic desirability of development proposals and determining an order of priority for implementation. The technical feasibility of projects identified is discussed in Annex V.

11.2 Projects Identified

The Qoryooley project (5 800 ha) was identified and has been studied to feasibility level (Part III). Three further projects, similar to Qoryooley, were identified as the Faraxaane, Shalambood and Golweyn projects, covering a gross area of 12 700 ha and involving around 4 800 family units. The Asayle project is also similar to the Qoryooley project except that it includes 11 large farms and the proposed co-operative development is based on only 1 ha NCA per household unit. A development of 2 000 ha of virgin and largely uninhabited land is proposed on the Mukoy Dumis project. This project provides an opportunity to test the feasibility of developing virgin land. The der flood project is proposed to test the feasibility of der cropping only; in terms of area, this is a smaller project, comprising only 1 200 ha.

The banana drainage project is proposed to evaluate the feasibility of installing drainage in about 2 800 ha of banana plantations. If accompanied by a reasonable level of management and crop husbandry, it is anticipated that considerable yield increases could be achieved.

The remaining sectors of the Study Area have been divided into development zones in which a general upgrading of the extension services is recommended.

11.3 Results of Financial and Economic Analyses

In the economic analyses, the viability of each project was tested and then projects were ranked in order of their economic attractiveness. It was found that all of the projects, except Asayle, gave internal economic rates of return greater than 8.0%. Of the projects involving annual cropping, Golweyn had the highest internal rate of return (IRR) at over 13.0%. The banana drainage project had an IRR of 15%. The net present values, discounted at 10.0% over 30 years, confirmed the economic order of priority.

A financial analysis was carried out for each project and an indication of repayment capacity is provided.

As a result of the analyses performed it was concluded that the der flood, banana drainage and development zone proposals should be initiated as soon as possible. The Golweyn, Shalambood and Faraxaane projects should follow in that order, after the Qoryooley project is completed. It is further recommended that a study be made of the banana industry, with the objective of determining the best means of raising the level of production and increasing exports.

Implementation of all projects identified would lead to considerable increases in production from the Study Area. Annual production of maize would be raised by 30 000 to 40 000 tonnes, rice by 15 000 to 20 000 tonnes, sesame by 6 000 to 7 000 tonnes and cotton by 12 000 to 16 000 tonnes. Banana production could increase by over 20 000 tonnes but this would be dependent upon higher managerial and technical inputs.

Most families in the Study Area would be able to achieve an annual income of So. Shs. 4 400, except in some of the more densely populated development zones, where the higher income would be possible only if work was to be found on the banana farms.

CHAPTER 12

PROJECT IDENTIFICATION AND ASSESSMENT OF PRESENT AGRICULTURAL PRODUCTION

12.1 Introduction

A number of projects have been identified in the Study Area. Their limits are based on boundaries formed by existing village areas, canals and landforms. In addition, boundaries have been rationalised to ensure that project areas are large enough to support the necessary overheads. After all the projects were identified, a number of areas remained which could not be consolidated within the main projects. A general upgrading is envisaged for these areas, many of which border the river or main canals, through improved extension services and better provision of inputs. These areas have been called development zones. All this is fully discussed in Annex VI, as are the possibilities and choice of development for each area. Further reasons for selection of development alternatives are given in Chapter 13 of the present annex.

Table 12.1 lists the projects identified and gives their gross and present net cultivated areas. The estimated number of households residing in these areas, based on 0.88 ha cultivated per family, is also shown. The figure of 0.88 is derived from the total net cultivated area, divided by the number of families in the Study Area. However, the larger towns, particularly Qoryooley, may distort the figures for population engaged in agriculture in the areas immediately adjacent to them because some people from the town will not be engaged in agriculture. Detailed demographic studies to ascertain the exact population status would be necessary before implementation is carried out. Project area livestock populations are estimated on a per household basis rather than a per hectare basis and will change if population moves into or out of an area.

Present cropping, as detailed in Chapter 3, is maize 140%, sesame 66% and some minor areas of intercropped pulses, based on the estimated present net cultivated area.

12.2 Value of Present Production

12.2.1 General

Table 12.2 summarises the value of present production for the Study Area. Figures for the development zones are detailed separately in Table 12.3. It is considered that there will be no change in production in the 'without project' situation with regard to annual crops and livestock. The banana situation, which is more complicated, is assessed in Section 12.2.2 and when considering the viability of projects and developments, the banana plantations are dealt with separately.

TABLE 12.1

Master Plan Areas - Gross and Present Net Cultivated Areas and Population

Projects	Gross project area	Present NCA(1)	Perennial cropping	Annual crops NCA(1)	Households (No.)
Faraxaane	5 000	2 324	-	2 324	2 640
Der flood	1 200	229	-	229	260
Mukoy-Dumis	2 060	113	-	113	130
Shalambood	6 255	2 101	358	1 743	1 980
Golweyn	3 700	854	108	746	850
Asayle	4 170	1 505	144	1 361	941
Banana drainage	2 830	1 560	1 560	-	-
Development Zones					
Janaale	3 165	1 310	272	1 038	1 180
Degwariiri	2 470	1 157	381	776	880
Bandar	1 815	691	-	691	790
Majabto	1 760	579	9	570	650
Haduuman	1 940	823	-	823	930
Jeerow	2 325	1 028	-	1 028	1 170
Waagade	3 790	903	333	570	650
Primo Secondario banana	3 020	1 451	1 067	384	440
Tahliil	2 765	907	50	857	1 070

Note: (1) NCA means net cultivated area in hectares

TABLE 12.2

Summary of Gross and Net Value of Present Production of Study Area ('000 So.Shs.)

	Faraxaane	Der flood	Mukoy Dumis	Shalam-bood	Gol-weyn	Asayle	Devel-opment zones	Qoryooley	Total
Net cropped area (ha)	2 324	229	113	2 107	854	1 464	8 849	2 227	
No of households(1)	2 640	260	130	1 980	850	941	7 760	1 639	
Revenue									
Maize	3 872	381	188	2 207	882	1 768	10 672	2 845	
Sesame	1 394	206	68	811	325	654	3 858	1 148	
Pulses	84	9	4	65	28	51	253	86	
Gross revenue	5 350	596	260	3 083	235	1 2 473	4 783	4 079	
Livestock(2)	1 280	307	528	1 269	565	422	3 830	1 338	
Total	6 630	903	788	4 352	800	1 2 895	18 613	5 417	
Bananas	-	-	-	2 376	717	916	14 017		
TOTAL				6 728	517	2 3 811	32 630		
Direct Costs									
Crops	271	27	13	203	87	159	783	208	
Gross margin excluding	6 359	877	775	4 148	713	1 2 736	17 830	3 871	
Bananas	-	-	-	1 539	464	593	9 081	-	
TOTAL Gross Margin	5 369	877	775	4 985	965	1 3 059	3 646	22 766	48 303

Notes: (1) Exludes banana farm
(2) This is not the value of present production on this area but the value attributed to these households
(3) Assumes no yield decline.

TABLE 12.3

Net Value of Present Production in Development Zones

Project	Maize	Sesame	Pulses	Total	Gross margin excl. bananas	Bananas	Total gross margin
Janaale							
Revenue	1 677.2	607.4	38.9	2 323.5		1 805	
Costs	87.2	34.0		121.2		1 170	
Gross margin	1 590	573.4	38.9		2 202	635	2 837
Degwariiri							
Revenue	1 098.5	407.8	29.1	1 535.4		2 529	
Costs	65.2	23.4		88.6		1 638	
Gross margin	1 033.3	384.4	29.1		1 447	891	2 338
Bandar							
Revenue	1 150.7	415	25.9	1 591.6			
Costs	58.0	22.6		80.6			
Gross margin	1 092.7	392.4	25.9		1 511		1 511
Majabto							
Revenue	807.2	290.7	21.4	1 119.3		60	
Costs	47.9	18.6		66.5		38	
Gross margin	759.3	272.1	21.4		1 053	22	1 075
Haduuman							
Revenue	1 370.9	494.0	30.9	1 895.8			
Costs	69.1	26.9		96			
Gross margin	1 301.8	467.1	30.9		1 800		1 800
Jeerow							
Revenue	1 712.4	617	38.6	2 368			
Costs	86.3	33.6		119.9			
Gross margin	1 626.1	583.4	38.6		2 248		2 248
Waagade							
Revenue	788.2	282.2	21.4	1 091.8		2 210	
Costs	47.9	18.6		66.5		1 432	
Gross margin	740.3	263.6	21.4		1 025	778	1 803
Primo Secondario bananas							
Revenue	640.2	230	14.4	884.6		7 082	
Costs	32.3	12.5		44.8		4 588	
Gross margin	607.9	217.5	14.4		840	2 494	3 334
Tahliil							
Revenue	1 428	514	32	1 974		332	
Costs	72	28		100		215	
Gross margin	1 356	456	32		1 874	117	1 991
Livestock So.Shs. 320/ha NCA maturity					3 830		

Notes: (1) Basic information used

	Price	Costs/ha	Yield
Maize	119	60)	
Sesame	250	54.5)	See table above
Pulses	125	-	1 q

(2) Hectarage of pulses is 30% of NCA.

12.2.2 Banana Production

An average annual yield of 13.3 t/ha of bananas is assumed. It is estimated that 65% of production is exportable and an economic farm gate price of So.Shs. 71/q is assumed. A proportion of the residual production is sold on the home market for an estimated So.Shs. 20/q (although very variable). In order to value the total present production and to give an indication of the value of local sales it is assumed that 50% of the non-exported production is sold at So.Shs. 20.

Costs and revenues on this basis are shown in Table 12.4, including the effect of a fall in annual yield from the present 13.3 tonnes to 10.2 tonnes of fruit per hectare after ten years. Yields have been declining over the last ten years at an even greater rate than this, and there is no reason to suppose that this will be arrested.

TABLE 12.4

Present and Future Costs and Revenues of Bananas (economic prices in So.Shs./ha)

Production period	Market	Yield (q)	Price	Total	Revenue	Direct costs	Gross margin
Present							
	Export	87	71	6 177	6 637	4 300	2 337
	Home(1)	46	20	460			
After 10 years							
	Export	67	71	4 757	5 007	4 300	707
	Home(1)	35	20	350			

Note: (1) Assumed that only 50% of fruit available for local market is actually sold.

Forecasting the decline of banana production is difficult but it is fairly clear that farmers will abandon fields before the gross margin anticipated ten years hence is reached. Because of the time it takes to reorganise production and/or to sell up, it is assumed that this decline continues until year 10, then maize and sesame, the basic crops, would be grown to give a gross margin of So.Shs. 1 700/ha. Taking an average gross margin of So.Shs. 1 700 after year 10 does not preclude the better farmers remaining in banana production but the average figure will still be representative. It should be noted that the above calculations are based on economic prices and that the financial prices facing the farmer reduce the selling price to So.Shs. 50/q and raises the labour element in the costs by So.Shs. 500. This has the effect of eliminating all returns before year 10.

The pattern of yield decline is clear and the results will be used in the banana drainage project for valuing present production. For the small areas of bananas within the development projects, it will not be misleading to take the present value of production without any fall over time as the 'without project' situation. The economic analysis (Chapter 15) provides an examination of the effect which this assumption could have on the final result.

CHAPTER 13

BASES FOR ANALYSIS

13.1 General

This chapter discusses the development alternatives facing each area, the identification of cropping patterns and yields and the various analyses that are necessary to indicate whether projects are viable and to determine a reasonable order for their implementation. Tables 13.1 and 13.2 (derived from Annex VI) outline the total available resources of land and people in the Study Area. The banana drainage project is described separately.

TABLE 13.1

Development Projects: Cultivable Areas and Smallholder Requirements

Project[1]	Gross project area (ha)	Maximum NCA[2] (ha)	Maximum NCA annual crops[3] (ha)	Families required[4]	Families affected by project[5]
Faraxaane	5 000	4 000	4 000	2 000	2 640
Der flood	1 200	960	960	480	260
Mukoy Dumis (Phase I)	2 210	1 650	1 650	825	130
Shalambood	5 405	4 324	3 966	1 983	1 980
Golweyn	2 340	1 873	1 765	883	850
Asayle	1 830	1 464	1 320[6]	990[6]	930

Notes: (1) Not applicable for banana drainage project.

(2) Data from Annex VII.

(3) Excludes banana production to be continued in each area.

(4) At 2 ha per family except Asayle project.

(5) See Table 27.2.

(6) 330 ha for large scale farmers and 990 ha for smallholders.

Source: Annex VI, Table 28.1

TABLE 13.2

Development Zones: Cultivable Areas and Smallholder Requirements

Zone	Gross area excluding perennial crops[1] (ha)	Maximum NCA annual crops[2] (ha)	Smallholder families	
			Required[3]	Present numbers[4]
Primo Secondario banana zone	1 445	870	870	440
Waagade	3 235	1 940	1 940	650
Majabto	1 745	1 050	1 050	650
Janaale	2 670	1 600	800 - 1 060	1 180
Degwariiri	1 835	1 100	550 - 730	880
Bandar	1 815	1 090	545 - 730	790
Haduuman	1 940	1 160	580 - 770	930
Jeerow	2 325	1 390	695 - 930	1 170
Tahliil	2 955	1 770	885 - 1 180	1 070
Non-development areas				
1	4 595	-	-	470
2	2 495	-	-	-
3	580	-	-	-

Notes: (1) From land use survey data

(2) Assumes 60% land use efficiency

(3) At 1.0 ha per family for the first three zones and 1.5 to 2.0 ha per family for Janaale to Tahliil zones

(4) See Table 27.2.

Source: Annex VI, Table 28.2

13.2 Annual Crop Irrigation Projects

The projects of Faraxaane, Shalambood, and Golweyn are all sufficiently similar to the Qoryooley project to be recommended for the same type of development as proposed for Qoryooley. The basic cropping pattern proposed (Chapter 5) is maize (40%), rice (40%), cotton (35%) and sesame (25%) with the option of forage on another 20%. Yields and costs will be the same as estimated for Qoryooley as will be the rate of development and progression of yields but as the precise details of these three areas are not finalised an average progression over the first 12 to 14 years up to maturity will be taken. A headquarters similar to that proposed for Qoryooley, with the same type of administration, would be set up in each area but no pilot farm is proposed. However, there would still be a need for an agricultural teacher and an irrigation engineer to be stationed at each project headquarters.

In the comparisons between projects, the small number of banana farms will be excluded because of the difficulty in assigning their benefits and the poor reliability of the data. The yield of bananas is considerable but external infrastructure is required for their production and therefore project ranking could be inaccurately influenced by their inclusion.

13.3 Der Flood Project

This project was identified in response to the wish of the Client, that the potential for the development of the der flooded area be investigated, using the present farming system. The important aspect of this system is low cost: minimal land levelling is required, fewer major irrigation works are necessary and consequently overheads are low. The cropping pattern and yields proposed are:

Maize 40%	30 q/ha
Sesame 60%	10 q/ha
Cotton 20%	18 q/ha

An IRR and a net return per hectare have been calculated to compare the der flood scheme with the other projects.

An alternative to the der flood project will be tested, by including this gross area of 1 200 ha with the Faraxaane project, taking yields and costs to be similar to those of the Qoryooley project and with the same organisation and management.

13.4 Mukoy Dumis Project

This project was identified in response to the wish of the Client to test the feasibility of developing virgin land for irrigation.

All development is limited by the overall water constraint, which dictates that the present gu season cropping (7% in this area) must not be exceeded. This limit restricts cropping to only the der season; the pattern proposed is :-

Maize	30%
Sesame	30%
Cotton	40%

Yields and costs are as for the Qoryooley project. Provision of full infrastructure would be essential particularly as development would necessitate an immigration of nearly 700 families.

The alternative to this type of development would be use for cattle grazing, subsidiary to the other areas. No studies have been possible on this alternative but it is unlikely to involve very large returns.

13.5 Asayle Project

The Asayle project area (1 830 ha gross) is similar to Qoryooley in its possibilities but differs in that it includes 11 large farms. It is proposed that these farms should be retained but reduced in size to the maximum of 30 ha allowed by the Government, which would result in a total of 330 ha as compared with the 1 300 ha currently held as large farms. As the present intensity of farming is low, the effects on output of the proposed reduction in cultivated hectares per farmer would be small.

The remaining 990 cultivated hectares would be available for co-operatives on the basis of 1 ha per family, with the families providing labour for the large farms and the 138 ha of existing banana plantations in the area. The proposed cropping patterns are :

(a) Large farms

Maize	40%
Rice	40%
Sesame	25%
Cotton	15%

(b) Co-operative smallholdings

Maize	60%
Sesame	50%
Cotton	30%

Yields and costs are as for the Qoryooley project. Although the large farms would not require provision of organisation and management, these facilities would be set up for the co-operative farms.

13.6 Banana Drainage Scheme

It is proposed to construct a drain through the centre of an area of 3 830 ha to ease the current drainage problem and to arrest the declining yields. However, a distinction between yield increases due to drainage and those due to agronomic improvements is complicated. It is therefore impossible to assign the appropriate benefits to the drainage work alone. The proposed yields for this project rely on better management as well as drainage, and the development includes costs estimated for the necessary infrastructural improvements. The average yield per hectare would rise from the present annual yield of 200 q/ha to 300 q/ha in ten years and the average life of a plantation would be expected to double from three to six years. Because of the reliance on inputs other than drainage, the analysis will investigate the sensitivity of these yields.

13.7 Development Zones

There are nearly 10 000 net cultivable hectares in the 20 000 ha gross remaining in the Study Area outside the limits of the proposed project areas. A general upgrading is planned for these areas based on the introduction of extension

services, more inputs and better marketing (Annex VI). A short analysis will be carried out on this form of development to give an indication of magnitudes of the returns.

Cropping patterns and yields proposed for the development zones are shown in Table 13.3, there being three alternatives. For some areas there are three alternative cropping patterns; these will be discussed more fully in the economic analysis.

Crop costs are estimated at 65% of the costs for the Qoryooley project.

13.8 Rate of Development

Each of the major projects, excluding the banana drainage scheme, is considered separately and on the basis that projects are not implemented at the same time. The alternative of the der flood project being included with the Faraxaane project is also considered. Construction periods for these projects vary between three and five years (Chapter 15). Rates of development are modelled on the Qoryooley project, as outlined in Part III of this annex. With the experience of implementing the Qoryooley project it should be possible in the future to make more detailed implementation and development programmes. It is possible that, despite provision of a training scheme, shortage of skilled manpower will act as a constraint on the rate of development. Again, experience in the Qoryooley project should help to enable this planning to be realistic.

TABLE 13.3

Proposed Cropping Patterns and Yields for Development Zones

Development Zone	Crop	Alternative cropping patterns			Yields (q/ha)
		(1)	(2)	(3)	
Janaale) Degwariiri) Bandar) Haduuman) Jeerow) Tahliil)	Maize	50%	50%	60%	25
	Sesame	30%	30%	30%	8
	Rice	20%	40%	-	20
	Cotton	20%	-	20%	15
Majabto) Primo Secondario banana)	Maize	60%	60%	-	25
	Sesame	50%	50%	-	8
	Cotton	30%	-	-	20
	Rice	-	20%	-	15
Waagade)	Maize	70%	-	-	25
	Sesame	50%	-	-	8

CHAPTER 14

VALUATION OF FUTURE AGRICULTURAL PRODUCTION

14.1 Introduction

The method of evaluating present production in the Study Area is as described in Chapter 8, in which different values are placed on land in present use categories 2 (marginal annual crop production) and 3 (irrigated annual crop production). The valuation of banana production (land use category 4) is described in Chapter 12; livestock production is assessed on the basis of the number of households which are likely to be in the area at project maturity. A maximum limit of 1.57 livestock units per hectare is adopted from the findings of the livestock survey (Annex V).

14.2 Project Areas

The valuation of future production for each of the projects similar to Qoryooley is based on the budgets given in Chapter 8, details of which are summarised in Tables 8.3, 8.4 and 8.5. Cropping patterns vary, as outlined in Chapter 13. The budget for the der flood project (Table 14.1) has been adjusted to account for the lower yields forecast for this area.

TABLE 14.1

Der Flood Project: Budget at Maturity
(So.Shs./ha)

Crop	Intensity	Yield (q/ha)	Revenue	Direct costs	Gross margin
Maize	40%	30	1 428	512	916
Sesame	60%	10	1 500	180	1 320
Cotton	20%	18	1 152	256	896
			4 080	948	3 132
Livestock			738	157	581
TOTAL			4 818	1 105	3 713

It is assumed that crop yields reach their optimum after eight years and this is superimposed on the implementation period to achieve the final output over the years of development. As the Master Plan is only an indicative study it was considered to be sufficient to build up the total gross margin on a proportional basis to 100% at maturity by using calculated factors based on the yield improvements and implementation period. Table 14.2 indicates the factors used to build up the cash flows.

TABLE 14.2

Factors Used for Gross Margin Calculations

Year	1	2	3	4	5	6	7	8	9	10	11	12	13
3 year implementation	0.00	0.07	0.21	0.44	0.59	0.73	0.84	0.90	0.95	0.98	1.00	-	-
Present production	0.20	0.55	1.00	1.00	-	-	-	-	-	-	-	-	-
4 year implementation	0.00	0.05	0.15	0.31	0.52	0.65	0.78	0.93	0.97	0.99	1.00	-	-
Present production	0.15	0.40	0.70	1.00	-	-	-	-	-	-	-	-	-
5 year implementation	0.00	0.03	0.10	0.20	0.34	0.56	0.70	0.79	0.89	0.93	0.97	0.99	1.00
Present production	0.10	0.25	0.45	0.70	1.00	-	-	-	-	-	-	-	-

14.3 Banana Production

An estimate of the present average crop budget is shown in Table 14.3 but this is derived from limited survey data. Full background details of banana production are given in Annex IV. It is estimated that the average crop life is three years.

TABLE 14.3

Banana Crop Budget (Economic Prices - So.Shs./ha/year)

Returns:	Export	Home	Total
Yield (q/ha)(1)	87	46 (50% sold)	
Price (So.Shs./q)(2)	71	20	
Return	6 177	460	6 637
Costs:			
Labour	1 750		
Pumping	810		
Spraying	130		
Chemicals	80		
Fertilisers	1 120		
Land preparation	410		4 300
GROSS MARGIN			2 337

Notes: (1) Annual yield based on 200 q/ha for a three year crop life

(2) So.Shs. 71 economic price allowing for cartons at So.Shs. 24 (economic price) and FOB costs of So.Shs. 25 from a price of So.Shs. 120/q FOB.

The estimated budget for bananas after ten years of improvement is shown in Table 14.4 based on annual yields rising to 300 q/ha and the average crop life being extended to six years. In the absence of any more precise data, there is assumed to be a linear rate of improvement over time. A full test of the implications is carried out in the economic analysis.

TABLE 14.4

Banana Crop Budget at Maturity (Economic Prices in So.Shs./ha/year)

Returns:			
	Export	Home	Total
Yield (q/ha)	200	50 (50% sold)	
Price (So.Shs./q)	71	20	
Return	14 200	500	14 700
Costs:			
Mechanisation		1 125	
Chemicals (including application)		1 995	
Fertiliser		1 220	
Labour		2 060	6 400
GROSS MARGIN			8 300

For the banana drainage project, data in Table 14.4 are used for comparison with the declining yield forecast for the 'without project' situation. In the other banana areas more moderate yield improvements are anticipated for the 'with project' situation, as discussed in the economic analysis.

14.4 . Development Zones

The cropping patterns proposed for the development zones, including various alternative patterns, are shown in Table 13.3. The choice of cropping was made to give the best financial return to the farmers. In the Majabto and Primo Secondario banana area, maize, sesame and cotton gave a financial gross margin So.Shs. 300 greater than the alternative with rice. The cropping pattern selected for the majority of the development zones is shown in Table 14.5, including the budgets for all the areas. The remaining budgets are presented in Appendix B.

TABLE 14.5

Farm Budgets for Development Zones (So.Shs./ha, Economic Prices)

Development zone	Intensity (%)	Yield (q/ha)	Revenue	Direct costs	Gross margin
1. Main Development Zones					
Maize	50	25	1 488	640	848
Sesame	30	8	600	90	510
Rice	40	20	1 758	560	1 198
			3 846	1 290	2 556
Livestock			738	157	581
TOTAL			4 584	1 447	3 137
2. Majabto and Primo Secondario					
Maize	60	25	1 785	432	1 353
Sesame	50	8	1 000	150	850
Cotton	30	15	1 440	384	1 056
			4 225	966	3 259
Livestock			738	157	581
TOTAL			4 963	1 123	3 840
3. Waagade					
Maize	70	25	2 083	504	1 570
Sesame	50	8	1 000	150	850
			3 083	654	2 429
Livestock			738	157	581
TOTAL			3 821	811	3 010

Some 2 000 ha of bananas exist within the development zones. These plantations have a present production of over So.Shs. 5.0 million and a potential of over So.Shs. 16.0 million; the implications of this situation are considered further in the economic analysis.

CHAPTER 15

ECONOMIC ANALYSIS

15.1 General

The purpose of the economic analysis of the Study Area is to indicate whether the identified projects are economically sound and financially viable and to propose a programme for their implementation based on all the available economic, social and technical factors. For the development zones, a summary is made of the costs and benefits likely to accrue from the proposed improvements.

15.2 Costs

Full explanations of the engineering costs for each of the project areas are given in Annex VII, but it should be emphasised that without final surveys the costs quoted are best estimates and should be used with the usual 20% allowance for contingencies. A summary of the capital costs is given in Table 15.1, including an estimate for the cost of initial feasibility studies. The project costs are divided over a construction period which is dependent on the size of project and technical problems anticipated. The Qoryooley project figures have been reworked on a similar basis, without a pilot farm, for comparison purposes.

TABLE 15.1

Capital Costs for Master Plan Projects

Project	Feasi-bility study	Project costs	Year 1	2	3	4	5
Qoryooley	2 076	90 629	40 783	18 126	13 594	9 063	9 063
Faraxaane	2 076	94 659	42 597	18 932	14 199	9 466	9 466
Mukoy Dumis	1 199	41 677	20 839	8 335	8 335	4 168	-
Shalambood	2 244	92 426	41 592	18 485	13 864	9 243	9 243
Golweyn	972	34 940	17 470	6 988	6 988	3 490	-
Asayle	760	29 700	17 820	5 940	5 940	-	-
Der flood	498	10 984	6 590	2 197	2 197	-	-
Banana drainage:							
Main drain	765	3 848					
In-field works		27 050					

The operation and maintenance costs of the projects are summarised in Table 15.2. Staff costs are based on the organisation and management requirement for the Qoryooley project, excluding the pilot farm but including the agricultural teacher and the irrigation agronomist.

TABLE 15.2

Summary of Operation and Maintenance Costs ('000 So.Shs.)

Project	Engineering buildings	Staff	Total	Foreign exchange
Qoryooley	1 549	1 425	2 974	1 000
Faraxaane	1 716	1 364	3 080	1 133
Mukoy Dumis	834	563	1 397	550
Shalambood	1 609	1 474	3 083	1 000
Golweyn	767	639	1 406	506
Asayle	517	499	1 016	341
Der flood(1)	88	150	238	58
Banana drainage:				
Main drain	90	-	-	-
In-field works	374	20(2)	484	306
Development zones	-	550(3)	550	-

Notes: (1) 10 personnel for 960 ha, including a small central storage area

(2) 2 extension assistants

(3) 50 extension assistants and 2 full time supervisors

All farm machinery is excluded from the capital costs as these are amortised and covered in the farm running costs. It is assumed that, as in the Qoryooley project, loans will be taken out and machinery bought by the farm co-operatives.

Table 15.3 shows the costs on a per hectare basis, which provides a useful comparison for the similar projects, especially Faraxaane, Shalambood and Golweyn but less so for the Mukoy Dumis and Asayle projects.

TABLE 15.3

Comparison of Capital and Operation Costs (So.Shs./ha)

Project	Capital cost	Operation cost
Qoryooley	22 500	743
Faraxaane	23 665	770
Mukoy Dumis	25 259	847
Shalambood	21 375	713
Golweyn	18 655	751
Asayle	20 287	694
Der flood	11 442	248

Note: The costs are spread over the full net cropped area which includes bananas in Golweyn, Shalambood and Asayle projects.

15.3 Projects at Maturity

Table 12.2 summarised the value of the projects at maturity using economic prices and showed the gross margins and net incremental benefit of development. Bananas are treated separately in each case so that individual project results can be evaluated separately from the bananas. The banana plantations will benefit from the better irrigation but management advice and technical assistance are required from outside the projects. This makes the allocation of benefits difficult to assess.

Table 15.4 summarises the relative economic position of each project on a per hectare basis at maturity but excluding bananas. It is assumed that the benefits from bananas will be at least enough to cover their share of the operation and maintenance costs.

TABLE 15.4

Summary of Projects at Maturity

(So.Shs./ha)

Project	Area (ha)	Gross margin	Net incremental benefit	Operation and maintenance	Net cash flow
Qoryooley	4 000	6 450	5 090	743	4 347
Golweyn	1 873	6 450	5 840	751	4 729
Shalambood	4 324	6 450	5 404	713	4 691
Faraxaane	4 000	6 450	4 680	770	4 090
Mukoy Dumis	1 650	4 720	4 250	847	3 403
Asayle	1 464	5 520	3 447	694	2 753
Der flood	960	3 173	2 799	248	2 551

15.4 Project Feasibilities

Cash flows have been generated for each of the projects except Qoryooley (Appendix E). The main purpose of these analyses is to investigate the viability and economic ranking of the projects but more detailed information is needed before close comparisons can be made between cash flows. Table 15.5 lists the internal economic rates of return of the projects and the net present values discounted at 10% over 30 years. All projects could be considered for subsequent feasibility studies except the Asayle scheme which should have a further desk study as information becomes available from the implementation of the Qoryooley project.

TABLE 15.5

Internal Economic Rates of Return and Net Present Values (discounted at 10% over 30 years)

Project	IRR (%)	NPV ('000 So.Shs.)	NPV/ha (So.Shs.)
Qoryooley	10.2	2 208	552
Golweyn	13.1	12 401	6 621
Shalambood	10.9	8 293	1 918
Faraxaane	9.0	-8 616	-2 154
Mukoy Dumis	8.1	-7 024	-4 257
Asayle	6.1	-12 236	-8 358
Der flood	12.6	3 083	3 211
Banana drainage			
Basic assumption (1)	15.0	11 428	7 326
Yield difference (2)	13.0	6 888	4 415

Notes: (1) Assumes yield increases with project and decreases without to a difference of 200 q after 10 years.

(2) Assumes yield increases to give 100 q yield difference after 10 years.

The banana drainage project shows a very favourable return based on the banana yields declining under the 'without project' situation. It is assumed that yield decline starts only when an area is drained, which therefore understates the real situation. The second analysis investigates the effect of reducing the yield difference at maturity between the 'with' and 'without' project situation (from 200 to 100 quintals); this alternative shows an IRR of 13%.

Table 15.5 shows the der flood project to have a high rate of return. This type of project was considered for Faraxaane, Mukoy Dumis and Asayle but investigation showed that the higher capital costs per hectare required in these cases cancelled out any advantages of the lower output/lower input system because of a disproportionate rise in the input costs.

The analyses were tested for a two year delay in commissioning projects but with capital costs remaining unchanged; under these circumstances the internal rate of return dropped by under 1%. It is important therefore that implementation should proceed as fast as is reasonable but a slightly longer implementation period is seen to be unlikely to make a project uneconomic.

15.5 Combined Der Flood - Faraxaane Project

One technically feasible alternative considered was the inclusion of the 960 ha of the der flood project within the 4 000 ha of the Faraxaane project. It is assumed that the der flood area would have the same cropping pattern and yields

as the Faraxaane area and that implementation costs per hectare would be the same. The relevant cash flow, as well as the difference between the cash flow of der flood production at both low and high intensity, are shown in Appendix E. The internal rate of return on the difference is calculated at 9%, which indicates that, in the case of these mutually exclusive projects, unless the difference in capital needed for the more intensive scheme can be invested elsewhere to yield at least 9%, then it is preferable to proceed with the larger project. However, as this difference is at 9%, it is likely to be below the opportunity cost of capital and would possibly make the smaller investment the safer one. The final judgement on this alternative is discussed in Section 15.8.

15.6 Financial Implications

The financial analysis of the Master Plan is restricted to ensuring that adequate income is available to the household and that the repayment capacities are adequate. For this purpose a financial analysis was made on a per hectare basis at maturity (Table 15.6).

The household target income of So.Shs. 4 400 has first call on the project income, followed by the operation and maintenance charges. The residue in Table 15.6 indicates the amount available for capital repayment which is seen to be adequate in the cases of the first three projects. The final column shows the repayment sum as a ratio to the capital invested. It can be inferred that the Asayle and Mukoy Dumis projects have minimal capital repayment capacity.

The foreign exchange flows on these projects are similar to those of the Qoryooley project, which showed a very favourable flow of about 40% of the net cash flow at maturity.

TABLE 15.6

Summary of Project Repayment Capacities at Maturity (So.Shs./ha)

Project	Gross margin	Household income	Operation and maintenance	Residue for capital repayment	Ratio of residue to capital invested
Golweyn	4 878	2 200	751	1 927	1 : 9.7
Shalambood	4 878	2 200	713	1 965	1 : 10.9
Faraxaane	4 878	2 200	770	1 908	1 : 12.4
Mukoy Dumis	3 420	2 200	847	373	1 : 67.7
Der flood	2 851	2 200	248	403	1 : 28.4
Asayle:					
co-operative(1)	4 383	4 400(1)	(694)	Nil	
large farms	3 768(2)		(694)(3)	Small	

Notes: (1) Coative is b-osed on onlyp 1 ha per fermily, givinaag low returns.
(2) Includes labour costs.
(3) The large farms have to pay all the operation and maintenance which leaves So.Shs. 18 000 per farm for other farm expenses and income; there is unlikely to be much left for capital repayment.

15.7 Banana Drainage Scheme

The financial plight of the banana farmers is critical and accompanied by very low average incomes (Annex IV). The average farmer receives a gross margin of So.Shs. 510/ha from a revenue of So.Shs. 4 810, based on the financial farm gate price for bananas for export of So.Shs. 50/q, the difference between this and the economic price being the price of the cartons.

With yields of 200 q/ha at maturity the gross margin will rise to So.Shs. 4 100. The capital required for in-field drainage works is So.Shs. 17 340/ha. If a farmer borrowed this money from the Somali Development Bank at the normal rate of 6.0% over 20 years, he would need to make an annual repayment of So.Shs. 1 510, as well as So.Shs. 300 for operation and maintenance of the system. A further So.Shs. 260/ha would be required as a contribution towards financing the main drain, also on the same credit terms. Initially these charges would be impossible for the farmer to bear and would leave a gross margin of only So.Shs. 2 030/ha at maturity.

The economic analysis of the banana drainage project showed a high internal rate of return of 15% and it was calculated that a positive net present value could be achieved with a yield difference of only 50 q between the 'with' and 'without' project situation at maturity (at 10% discount). The predicament is that the economic benefit to the country is considerable but the farmers, at present prices, would be unlikely to be able to participate in such a development or even continue in production.

15.8 Implementation

The development zones and the banana drainage project will be discussed separately. Internal rates of return (Section 15.4) indicate that all other projects except the Asayle project should be considered for implementation. The Asayle and Mukoy Dumis projects have been shown to have virtually no repayment capacity (Table 15.6). Although the Asayle project cannot be recommended on the information presently available, it is suggested that a pre-feasibility study be carried out at a later stage when more information is available from other projects.

The Mukoy Dumis project is a special case, depending upon development of virgin land, as is reflected in the higher capital costs of implementation. The internal economic rate of return is reasonable and justifies a feasibility study; this favourable rate is due to the low present productivity of the area but the financial situation is poor and gives a low repayment capacity. Socially and politically this type of project is attractive, as the national objective of resettlement can be achieved.

This study does not indicate that this is the best virgin land to develop, only that the development of virgin land can be economically and socially viable. It is recommended that a more general investigation of other possibilities is made prior to further decisions on this project.

The ranking of the projects by internal rates of return and net present values per hectare (discounted at 10% over 30 years) is shown in Table 15.7.

TABLE 15.7

Ranking of Projects

	Project	Net cropped area (ha)	Banana area (%)
1.	Golweyn	1 873	6.0
2.	Der flood	960	0
3.	Shalambood	4 324	7.0
4.	Faraxaane	4 000	0
5.	Mukoy Dumis	1 650	0
6.	Asayle	1 464	11.0

Note: Ranking based on IRR and NPV per hectare discounted at 10% over 30 years.

In the calculation of the two economic indicators (Table 15.7) it is assumed that the banana areas would cover only operation and maintenance costs, although they would contribute more to the national economy. However, as the banana areas are included in the higher priority projects (with the notable exception of Asayle), considerations of the national economy are likely to affect the ranking of only the Asayle project. Taking the basic assumption for bananas, that is assuming maximum yield increases, the net present value per hectare of the Asayle scheme rises to So.Shs. 7 110, which alters neither its ranking nor its viability.

It is recommended that until the Qoryooley project is implemented, no other similar projects be started. The principal reasons for this recommendation are that important lessons could be learnt from the experience of implementing the Qoryooley scheme and that the general shortage of skilled staff could adversely affect development success if more than one project were to be implemented at once. Indeed, because of the likely strain on local resources it is recommended that not more than one project should be implemented at any one time.

It was shown in Section 15.5 that the der flood project amalgamated with Faraxaane project showed no economic advantage if capital could be invested elsewhere at over 9%, but the comparison assumed that both projects would be implemented at the same time. The ranking of Faraxaane (which will not alter even with this enlargement) means it will not be implemented for at least ten years, whereas as a result of its low capital costs, the der flood project could start at once. The ten year difference in commencement swings the economic advantage in favour of the der flood project being implemented separately.

It is therefore proposed that the projects should be implemented in the following order: Qoryooley, Golweyn, Shalambood, Faraxaane and possibly Mukoy Dumis. Moreover, it is recommended that feasibility studies of Golweyn and Shalambood areas be executed together so as to ensure the best allocations of resources in that area.

The der flood project, trials for the banana drainage project and the upgrading of the development zones should start immediately.

The most obvious omission is any concerted plan for the 2 000 ha of bananas which already exist in the development zones; this has been dictated mainly because the Government has discouraged any serious study of the banana situation. It is therefore recommended that a study should be initiated to investigate the banana industry, with the object of determining the best means of raising the level of production and increasing exports. At present, 42% of the country's bananas are grown in the Study Area, providing 10% of the national foreign exchange earnings, with a potential for earning considerably more. Thus it is essential that a more positive policy is adopted towards this important crop.

15.9 Monitoring and Evaluation

It is proposed that a monitoring and evaluation unit be set up at the Qoryooley project. The functions of this unit would be to collect and analyse data from the Qoryooley project in order to aid management of this project, to provide information to the Government (and possibly aid organisations) and to provide a base from which to plan the developments of the rest of the Study Area. Once established, the unit would require a full time economist and a statistician, although in the first year a greater staff input would be required to initiate the system. It is recommended that the monitoring and evaluation unit be attached to the statistics department of the State Planning Commission.

15.10 Renovation of Barrages

The renovation of the existing barrages across the Shabeelle river is discussed and costed in Annex VII and details of the engineering priorities are given. A summary is provided here to indicate the economic order of priority for renovation, based on the information available.

(a) Janaale Barrage

Renovation of this barrage is the first priority. The Janaale barrage irrigates a large area but is considered to be unsafe and therefore renovation work should not be delayed.

Capital cost is estimated at So.Shs. 5.95 million and annual maintenance at So.Shs. 595 000.

(b) Falkeerow Barrage

This barrage is not in a critical condition but renovation work should be done before too long. The immediate priority is for downstream work which would cost So.Shs. 400 000. New gates and complete renovation of the barrage, which would cost So.Shs. 2 million, are required but could be delayed for up to five years.

Total cost would be So.Shs. 3.04 million and annual maintenance So.Shs. 304 000.

(c) Qoryooley Barrage

This barrage serves a small area and following completion of the Qoryooley project it will serve only the Faraxaane project and the Haduuman development zone. When the Faraxaane project is implemented the repair and operation of this barrage will be difficult to justify. Complete renovation of the barrage would cost So.Shs. 2.53 million whereas with relatively minor repairs costing about So.Shs. 500 000, it could last for ten years. Therefore, provided the Faraxaane scheme is accepted, it is recommended that such repairs be executed at once.

Total cost would be So.Shs. 500 000 and annual maintenance So.Shs. 50 000.

The above discussion indicates that the total cost of renovating barrages would be So.Shs. 9.49 million, with total annual maintenance costs of So.Shs. 949 000.

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APPENDIX A

COSTS AND REVENUES OF CURRENT PRODUCTION

APPENDIX A

COSTS AND REVENUES OF CURRENT PRODUCTION

TABLE A.1

Summary of Costs of Current Production (So.Shs./ha)

	Financial costs	Economic costs
Land preparation (10% at So.Shs. 250/ha)	25	25
Maize:		
Labour 403 manhours only (10% hired at So.Shs. 1.0) (covers shelling etc.)	40	20
Seed (20 kg/ha at So.Shs. 75/q)	15	15
Total	80	60
Sesame:		
Labour 349 manhours only (10% hired at So.Shs. 1.0)	35	17.5
Seed (5 kg/ha at So.Shs. 240/q)	12	12
Total	72	54.5
Pulses:		
No costs assumed		

TABLE A.2

Household Farm Budget under Existing Agriculture

	Land use category(3)	
	2	3
Area farmed (NCA) ha	1.35(1)	1.35(1)
% of land in this category	58%	42%
Maize:		
Intensity	140%	140%
Yield (q/ha)	6	10
Price (So.Shs.)	75	75
Gross revenue (So.Shs.)	850.5	1 417.5
Farm costs excluding family labour	151.2	151.2
Net revenue (Maize)	699.3	1 266.3
Sesame		
Intensity	66%	66%
Yield	2.5	4
Price (So.Shs./q)	240.0	240
Gross revenue	534.6	855.4
Farm costs excluding family labour	64.1	64.1
Net revenue (Sesame)	470.5	791.3
Pulses		
Intensity	31%	31%
Yield (q/ha)	1	1
Price	100	100
Net revenue (Pulses)(1)	41.9	41.9
Total net revenue	1 211.7	2 099.5
Average net revenue(2)	1 584.6	
Estimated benefit from vegetables	165.0	
Income	1 749.6	
Revenue from livestock	640	
Total income	23 896	

Notes: (1) No costs involved, seed allowed for.
(2) Figures only valid on an average basis.
(3) Present land use categories: 2 = Marginal annual crops
3 = Irrigated annual crops

TABLE A.3

Present Production Costs for Bananas (So.Shs./ha/year)

Field operation	Cost
Labour 350 mandays/ha So.Shs. 5/manday	1 750
Pumping (fuel costs only) So.Shs. 625/24 hours/35 ha for 90 days every 2 years	810
Aerial spraying So.Shs. 65 per spray; 2 sprays/year	130
Chemicals (at planting only) 7 litres Nemagon x So.Shs. 20.55/l 4 kg wetting agent; So.Shs. 17.30/kg 6 kg BHC x So.Shs. 17.30/kg (applied every three years)	80
Fertilisers 8 q/ha/year at So.Shs. 140/q	1 120
Land preparation 17.5 hours x So.Shs. 0.70/h (every three years)	410
Total field production costs/ha	4 300

Note: Data based on information reported in Annex IV.

APPENDIX 8

COSTS AND REVENUES OF PROPOSED DEVELOPMENTS

APPENDIX B

COSTS AND REVENUES OF PROPOSED DEVELOPMENTS

B.1 Machinery Running Costs (Economic Prices)

Basic information is derived from ONAT prices (financial prices are CIF + 60% average), taking economic prices as CIF + 25% handling and distribution.

TABLE B.1

Tractor Operating Costs

	So. Shs.
Average cost (60 and 70 hp models)	76 200
Depreciation at 10 000 hours life expectancyy (cost/h)	7.62
Maintenance 20% capital cost 1 500 h/year	10.16
Wages as before	10.00
Fuel, tax and insurance	12.00
Equipment costs as before at 25% plus CIF rather than 60% plus CIF	9.75
	49.53
Plus 20%	9.91
TOTAL	59.44

Average cost of tractor running So. Shs. 60/h

TABLE B.2

Combine Harvester Operating Costs

	So. Shs.
Capital Cost (CIF plus 25%)	218 750
Depreciation at 10 000 hours life expectancy	21.9
Maintenance at 15% capital cost plus 400 h/year	82.0
Wages as for tractor	10.0
Fuel at 10 l/h	16.0
Tax and registration	1.0
	130.9
Plus 25% contingencies	26.2
TOTAL	157.1

Running cost taken as So. Shs. 157/h

TABLE B.3

General Land Preparation Costs

	Tractor h/ha	Times/year % of NCA	Cost/ha[1] (So. Shs.)
Jibal land levelling [2]	0.74	1 x 60	31.5
Ploughing	2.65	1 x 60	95.4
Harrowing	0.95	1 x 60	34.2
Gu fallow weeding	0.68	4 x 40	65.3
			226.4

Cost/year/cropped ha $\frac{226}{1.6}$ = 141.5

Notes: (1) Cost of tractor/h = So. Shs. 60

(2) Cost of levelling/h = So. Shs. 71

Cutworm control (without labour) = So. Shs. 21.05

B.2 Machinery Running Costs (Financial Prices)

TABLE B.4

Tractor Operating Costs

	So. Shs.
Average cost (60 and 70 hp models)	97 500
Depreciation at 10 000 hours life expectancy Cost/h	10.00
Maintenance 25% capital cost plus 1 500 h/year	13.50
Wages So. Shs. 15/operator 6 hour day Includes shiftwork and mechanic	10.00
Fuel, tax and insurance	12.00
Implement costs	12.50
	58.00
Plus 20% gives	69.60

Average cost of tractor running = So. Shs. 70

TABLE B.5

Combine Harvester Operating Costs

	So. Shs.
Average cost	276 000
Depreciation, 10 000 hours working life	28.00
Maintenance 15% capital cost per year plus 400 h/year	103.50
Wages as for tractors	10.00
Fuel, tax and insurance	17.00
	158.50
20% contingencies	31.50
TOTAL	190.00

B.3 Machinery Requirements for Pilot Farm

TABLE B.6

Costs of Machinery

		So. Shs.	Foreign exchange %
A.			
	Tractor (65 hp)	85 000	
	Trailer	15 000	
	Feed mixing unit	20 000	
	Green crop ensiler	30 000	
		150 000	62.5
B.			
	Rice huller	11 000	
	Rice seeder	1 000	
	2 Balances	2 425	
	2 Maize shellers	150	
	1 Groundnut sheller	850	
	1 Groundnut stripper	1 100	
	Rice weeder	125	
	Rice cutter	350	
	Foot thresher	950	
		17 950	
	Research and development	5 750 5 000	
	TOTAL	28 700	

B.4 Crop Production Costs

TABLE B.7

Cotton

	Financial prices (So. Shs./ha)		Economic prices (So. Shs./ha)	
	Year 1	Year 8	Year 1	Year 8
A. Costs independent of yield				
(i) Machinery				
Tractor operation 4.28 h @				
So. Shs. 70 (1)	299.6	299.6	-	-
So. Shs. 60 (2)	-	-	256.8	256.8
Spraying	24.3	24.3	24.3	24.3
Levelling (averaged)	174.0	174.0	141.5	141.5
	497.9	497.9	422.6	422.6
(ii) Materials				
Fertiliser:				
year 1 to 4	249.05		321.71	
year 5 onwards		470.35		515.61
Chemicals and 826.65)				
cutworm control + 21.05)	847.7	847.7	847.7	847.7
Seed (1)				
year 1	30		30	
year 2 onwards		14.4		14.4
	1 171.75	1 332.45	1 199.41	1 377.71
B. Costs dependent on yield				
(i) Machinery				
Tractor operation 0.08 h/q @				
So. Shs. 70 (1) = 5.6/Yn (3)	56	140		
So. Shs. 60 (2) = 4.8/Yn			48	120
	56	140	48	120
	1 725.65	1 970.35	1 670.01	1 920.31

Notes: (1) Financial prices
(2) Economic prices
(3) Where Yn is the yield in quintals in year n after implementation
(4) Difference in financial and economic prices when seed repurchased from Somalia cannot be estimated.

TABLE B.8

Rice

	Financial prices (So. Shs./ha)		Economic prices (So. Shs./ha)	
	Year 1	Year 8	Year 1	Year 8
A. Costs independent of yield				
(i) Machinery				
Tractor operation 4.09 h @				
So. Shs. 70 (1)	286.3	286.3		
So. Shs. 60 (2)			245.4	245.4
Combine operation 1.23 @				
So. Shs. 190 (1)	233.7	233.7		
So. Shs. 157 (2)			193.11	193.11
Spraying	8.8	8.8	8.8	8.8
Levelling etc.	17.4	17.4	141.5	141.5
	702.8	702.8	588.8	588.8
(ii) Labour				
Bird scaring (50% shadow price)	420	420	210	210
(iii) Materials				
Fertiliser	280.9	280.9	307.51	307.51
Chemicals and 642.70				
cutworm control 21.05	645.75	645.75	645.75	645.75
Seed:				
year 1/year 2: 350(1), 338 (2)	270	227.5	270	219.7
	1 196.65	1 154.15	1 223.26	1 172.96
B. Costs dependent on yield				
(i) Transport, drying etc.				
Transport 2.5 Yn (3)				
Milling 1.3 Yn				
Drying 0.7 Yn				
4.5 Yn				
Tractor operation (1)				
+ 2.1 Yn = 6.6 Yn (1)	105.6	198		
Tractor operation (2)				
+ 1.8 Yn = 6.3 Yn (2)			100.8	189
	105.6	198	100.8	189
	2 425.05	2 474.95	2 122.86	2 160.76

Notes: (1) Financial prices
(2) Economic prices
(3) Where Yn is the yield in quintals of paddy in year n.

TABLE B.9

Sesame

	Financial prices (So. Shs./ha)		Economic prices	
	Year 1	Year 8	Year 1	Year 8
(i) Machinery				
Tractor operation 2.14/h @				
So. Shs. 70 (1), (3)	149.8	149.8		
So. Shs. 60 (2)			128.8	128.8
Levelling etc	174.0	174.0	141.5	141.5
	323.8	323.8	269.9	269.9
(ii) Materials				
Fertiliser				
year 1 to 4	112.95		123.93	
year 5 onwards		133.4		146.46
Chemicals and 1.20 cutworm control 21.05	22.25	22.25	22.25	22.25
Seed at So. Shs. 240	20.4	20.4	20	20
	155.60	176.05	166.18	188.71
TOTAL	479.40	499.85	436.08	458.61

Notes: (1) Financial prices

(2) Economic prices

(3) Range on tractors by yield is only So. Shs. 4 average which is taken as 5% of cost.

TABLE B.10

Maize

	Financial prices (So. Shs./ha)		Economic prices (So. Shs./ha)	
	Year 1	Year 8	Year 1	Year 8
A. Costs independent of yield				
(i) Machinery				
Tractor operation 329 h @				
So. Shs. 70 (1)	230.30	230.30		
So. Shs. 60 (2)			197.3	197.3
Spraying	5.4	5.4	5.4	5.4
Levelling (averaged)	174.0	174.0	141.5	141.5
	409.7	409.7	344.3	344.3
(ii) Materials				
Fertiliser				
year 1 to 4	295.05		321.71	
year 5 onwards		377.2		414.13
Chemicals and 186.30)				
cutworm control + 21.05)	207.35	207.35	207.35	207.35
Seed (4)				
year 1	23.20		23.20	
year 2 onwards		15.00		15.00
	524.5	599.55	552.26	645.28
B. Costs dependent on yield				
Shelling 0.33 Yn(3)				
Drying 0.70 Yn				
Tractor: 0.33 h/q @				
So. Shs. 2.33 Yn(1) 3.36 Yn(1)	60.5	134.4		
So. Shs. 2.00 Yn(2) 3.03 Yn (2)			54.54	121.2
	60.5	168.05	54.54	151.2
TOTAL	994.8	1 143.65	951.1	1 110.78

Notes:
(1) Financial prices
(2) Economic prices
(3) Where Yn is yield in quintals in year n after implementation
(4) Seed price from year 2 at ADC price So. Shs. 75/q

TABLE B.11

Mixed Forage for Livestock Improvement Project

	Financial prices (So. Shs./ha) Yn	Economic prices Yn
(i) Machinery		
Tractor operation 12.89 h @		
So. Shs. 70 (1)	902.3	
So. Shs. 60 (2)		773.4
Levelling	174.0	141.5
	1 076.3	914.9
(ii) Materials		
Fertiliser	240.0	262.42
Chemicals and 3.75) cutworm control 21.05)	24.8	24.8
Seed	40.0	40.0
	304.8	327.26
	1 381.1	1 242.16
At 65 t/ha cost is:		
So. Shs. 21.25/t financial		
So. Shs. 19.11/t economic		
(iii) Labour		
340 manhours plus 10% = 374 manhours		
at So. Shs. 1		374.0
at So. Shs. 2	748.0	
	3 205.4	2 531.06
Cost per tonne at yield of 65 t/ha	49.3	38.9

Notes: (1) Financial prices

(2) Economic prices

TABLE B.12

Mixed Forage

	Financial prices (So. Shs./ha) Yn	Economic prices Yn
(i) Machinery		
Tractor operation 7.1 @		
So. Shs. 70 (1)	497	
So. Shs. 60 (2)		426
Levelling	174	141.5
	671	567.5
(ii) Materials		
Fertiliser	240.0	262.46
Chemicals and 3.75)		
cutworm control 21.05)	24.8	24.8
Seed	40.0	40.0
	304.8	327.26
	975.8	894.76
At 65 t/ha costs are:		
So. Shs. 15.0/t financial		
So. Shs. 13.75/t economic		
(iii) Labour		
340 manhours plus 10% = 374 manhours @		
So. Shs. 1 (1)	374.0	
So. Shs. 2 (2)		748.0

Notes: (1) Financial prices
(2) Economic prices

B.5 Pilot Farm Budget (Maturity)

The pilot farm comprises 128 ha NCA under normal production patterns. This includes 10 ha for research, which will be included at the same variable costs returns. The pilot farm includes nine household plots.

TABLE B.13

Budget at Financial Prices (So. Shs.)

Crop	Price	Area (ha)	Revenue	Costs	Gross margin
Maize	75	49.75	149 250	56 897	92 353
Rice	356	60.5	412 913	149 734	263 179
Sesame	240	44.25	106 200	22 125	84 075
Cotton	250	36.5	228 125	71 917	156 208
Forage		23.5		32 456	
Intensity: 167%		214.5			595 814

TABLE B.14

Budget at Economic Prices (So. Shs.)

Crop	Price	Area (ha)	Revenue	Costs	Gross margin
Maize	119	49.75	236 810	55 261	181 549
Rice	338	60.5	398 695	130 680	268 015
Sesame	250	44.25	110 625	20 355	90 270
Cotton	320	36.5	292 000	70 091	221 909
Forage		23.5		29 191	
TOTAL		214.5			761 743

B.6 Development of Nimcooley Class 6 Lands

TABLE B.15

Yields

Crop	Gu	Der	Area (ha)	Yield assumed at matur-ity	Yield progression (by year) 1	2	3	4	5	6	7	8
Maize	0.4		82.8	25	10	12	14	16	18	20	22	25
Sesame		0.25	51.75	8	4	4.5	5	5.5	6	6.5	7	8
Cotton		0.35	72.45	15	8	9	10	11	12	13	14	15
Vegetables		-	-	-	-	-	-	-	-	-	-	-
TOTAL area			207.0									

Intensity 100%

TABLE B.16

Costs and Revenues

	Economic Prices Yield	Price	Gross revenue	Costs (1)	Net revenue	Financial Prices Price	Gross revenue	Costs (1)	Net revenue
Maize	25	119	246.3	61.4	184.9	75	155.3	63.3	92.0
Sesame	8	250	103.5	15.4	88.1	240	99.4	16.8	82.6
Cotton	15	320	347.8	91.6	256.2	250	271.7	94.2	177.5
Vegetables		40	8.2		8.2	40	8.2		8.2
			705.8	168.8	537.4		534.6	174.3	360.3

Notes: (1) Costs assumed at 65% of Qoryooley project costs as production lower.

Machinery will be hired from Nimcooley village.
Two extension agents will be appointed.
It is assumed that livestock development will take place in a similar way to the rest of the project area.
Full details and description of the situation can be found in Annex VI, Chapter 25.
NCA of land excluded 207 ha.
Number of families excluded 85.

B.7 Production Costs for Bananas

TABLE B.17

Production Costs for Bananas (So. Shs./ha)

	Year 1	Subsequent years
(i) Machinery		
Tractor operation:		
Crawler 16 h @ So. Shs. 100	1 600	
Tractor 74 h @ So. Shs. 74	110	
	1 710	-
Transport for harvest		1 008
Chemical application	14	
(ii) Chemical Costs		
Nematode	1 902	1 902
Herbicide	560	
	2 462	1 902
(iii) Fertilisers	1 219	1 219
(iv) Labour		
Mandays/ha 221 year 1	1 105	
450 year 2		2 250
	6 510	6 379

Note: Average field costs for a six year crop, So. Shs. 6 401/ha

Source: Annex VI

APPENDIX C

MARKETS AND PRICES

APPENDIX C

MARKETS AND PRICES

C.1 Introduction

The market study concentrates on the existing crops of maize, oilseeds and bananas and the proposed crops of cotton and rice for the Study Area. A brief study is also included of the grapefruit market for background to a large proposed grapefruit project, and a summary of the livestock situation as it affects the Study Area.

The Study Area is relatively close to the capital and port of Mogadishu and is served by a good tarmac road. Most large villages have their own markets but all surplus production is taken to Mogadishu. Mogadishu is used as the centre for calculations of border parity prices because of its location in the flow of goods and services. Haulage rates vary, but an average figure of So.Shs. 60/t is assumed from the Project Area to Mogadishu for most agricultural commodities.

The Study Area also has good communications and a tarmac road to Marka, the port for banana exportations.

C.2 Cereals

C.2.1 General

The principal cereal crops grown in Somalia are sorghum and maize. Sorghum is grown almost exclusively under rainfed conditions and accounts for at least 50% of the cultivated area although yields are very variable and mainly low. Maize is mainly grown under some form of irrigation and nearly 60% of the country's maize is grown in the Lower Shabeelle Basin, the area in which the project Study Area is located.

The Government established the Agricultural Development Corporation (ADC) in 1971 to handle the purchasing, storage and marketing of all domestic grain (see Annex III, Chapter 3). ADC is now responsible for maize, sorghum, rice, oilseeds (particularly sesame) and cotton from the domestic market, and also for the importation of maize and sorghum. Farmers are required to sell all of their production to ADC except for an allowance of 100 kg of cereals and 30 kg of sesame a month. This can be retained for home consumption. There is no strict control on this retention which leads to difficulties in estimating production levels.

ADC estimates that it has storage for 180 000 t of grain in the country. The Foreign Trading Agency has about 10 000 t storage for rice in Mogadishu. Other estimates put the ADC total storage at about 100 000 t.

C.2.2 Production

Production statistics for the country are based almost exclusively on the ADC purchases (see Table C.1). ADC officially estimates that these figures understate production variously between 35 and 40%, assuming that only the permitted quantity of cereals is withheld per family. Actual production is probably nearer 50% greater in a normal year, rising to 80 to 100% in drought years. The Ministry of Agriculture estimates of area under each crop are based

TABLE C.1

Marketed Grains Purchases by the Agricultural Development Corporation 1971-77[1] (tonnes)

	1971	1972	1973	1974	1975	1976	1977
Maize							
Gu[2]	45 221	56 640	9 479	9 853	26 506	30 000	20 000[3]
Der	9 279	5 781	7 604	5 240	6 500	20 000	
Total	54 500	60 421	18 083	15 093	33 006	50 000	
Sorghum							
Gu	13 370	19 338	3 113	5 849	18 494	10 000	40 000[3]
Der	15 989	18 257	3 167	1 047	7 500	30 200	
Total	29 359	37 595	5 280	6 896	25 994	40 220	
TOTAL	83 859	98 017	23 362	21 989	59 000	90 220	

Notes: (1) ADC officially estimates total production to be 40% greater than purchases. Production is probably far more than this.

(2) Gu season: April to July. Buying period August to January.
Der season: September to December. Buying period February to July.

(3) Estimate.

Source: ADC.

entirely on production and yield estimates from a few limited sources. Consequently, at best, the figures are an indication of magnitude only. However, it is considered that the Study Area, situated in the Lower Shabeelle region, is the most productive area in the country and the Ministry of Agriculture estimate that 57% of the maize hectarage and 51% of the rice hectarage is in the Lower Shabeelle region, as indicated in Table C.2.

Rice production is estimated at about 3 500 t from just under 2 000 hectares in 1978.

TABLE C.2

Cereal Hectarages

	National	Lower Shabeelle	Study area	Lower Shabeelle as a % national	Study area % national
Maize	101 800	58 000	22 400	57	22
Rice	4 430	2 260	400	51	9
Sorghum	186 088	30 000	-	16	-

Minimum estimates compiled by the Ministry of Agriculture, September 1977.

C.2.3 Cereal Demand

The population's effective demand for cereals is a function of occupation, food availability and ability to pay. There is an important division in the Somali population, according to eating habits, between the nomads, and the settled agriculturalists and urban population, the nomads eating very little cereals. This division accentuates the problem of estimating present consumption levels or making demand projections. Demand projections for total cereals have been made up from FAO and technical estimates, and are shown in Table C.3. They allow for increases in per capita consumption of 1.3 to 1.5% annually giving an overall 4% per annum increase in demand, although this is possibly rather high.

TABLE C.3

Demand for Cereals in Somalia 1975 - 1990

Year	Total cereals (tonnes x 1 000)	Per capita (kg)	Wheat (tonnes x 1 000)	Rice (tonnes x 1 000)	Maize/sorghum (tonnes x 1 000)
1975	340	97	19	27	295
1980	414	105	26	35	353
1990	612	120	53	67	494

Source: FAO Commodity Projection 1970-80
Technical for 1990

C.2.4 External Trade

Imports of cereals (Table C.4) are considerable, and have been increasing even after the drought years of 1974 and 1975. Rice has tended to be the most important commodity but recently maize and wheat imports have become significant, rising to over 70 000 t per annum.

C.2.5 Balance of Supply and Demand

The production and import estimates suggest a considerable shortfall of cereals relative to the demand projections - even allowing for large unrecorded production and consumption. The State Planning Commission indicates that it believes there will be an increased deficit, by their 1977 estimate, in the food supply for the country, with rice and maize/sorghum import requirements estimatd at double the present levels. There is no major expansion of maize production foreseen and wheat is unsuitable for the Somali climate except in limited areas in the north. So, even with the most optimistic production levels, import substitution of maize is likely for the foreseeable future. As an important maize producing area already, the Project Area produces more than it requires and sends the surplus to Mogadishu.

TABLE C.4

Cereal Imports into Somalia 1975-78 (tonnes)

Year	Rice	Wheat	Sorghum	Maize	Total
1965	7 819	13 384	6 056	3 533	30 792
1966	22 078	11 818	2 917	158	36 971
1967	17 328	9 961	713	118	26 120
1968	15 253	11 552	138	280	27 323
1969	15 999	18 975	511	2 085	57 522
1970	23 270	22 054	463	1 044	46 831
1971	36 173	33 943	1 775	27 537	99 428
1972	26 625*	29 879	13	-	56 598
1973	29 775	14 431	25	2	44 243
1974	16 875	10 102	-	11 000	37 977
1975	21 963	36 510	7 070	60 000	125 543
1976	18 500	42 752	-	30 000	91 252
1977	28 750	N.A.	-	30 000	NA

Source: National Foreign Trading Agency - Annual Abstract of Statistics 1974, 1975.

Future rice production in the country is planned to increase dramatically with numerous projects raising the production to nearly 300 000 t by the year 2000 (State Planning Commission, 1977).

However, the low level of commitment to projects, the poor record of project implementation in the country, the mushrooming of other projects and the lack of skilled manpower make it unlikely that anything exceeding 50% of this level will be achieved. Hunting Technical Services Ltd estimated that proposed and possible

areas of rice would only give a maximum of 80 000 t in the foreseeable future. (Hunting Technical Services, Ltd, 1977). The projections of rice demand plus a consumer preference for rice over wheat would indicate that the country will be importing rice at least until after the year 2000. As rice production in the project area will be increasing over the next few years and domestic consumption, although it is difficult to estimate, is unlikely to reach production levels, it will be assumed that the area will export rice to Mogadishu.

C.2.6 Prices

The Government, through the ADC, fixes prices normally at which all cereals will be bought. Buying points are located in all large villages so that this price is roughly equally fair to all growers. The progress of producer prices is shown in Table C.5. These prices are applicable to any quality of grain. Rice is bought on a milled rice basis at a local mill (there is only one on the Shabeelle river at Shalambood). ADC is then responsible for handling, storage and marketing to the municipalities wherever it is required.

TABLE C.5

Somalia: Producer Prices for Cereals 1973-78 (So.Shs./q)

	1973	1974	1975	1976	1977	1978
Maize and sorghum	42	50	55	60	75	75
Index(1)	100	101	93	89	101	101
Upland rice (milled basis)	250	250	250	250	350	350

Note: (1) Index deflated by the consumer price index, Mogadishu.

Source: ADC

As there is no free market for grains, future farm gate prices are dependant on Government decisions. Maize and sorghum prices have moved up with inflation but are well under present world market prices. The Government has been subsidising maize imports by, on average, So.Shs. 50.00/q to maintain the fixed selling price. The importance of maize as a staple food will probably encourage the Government to keep the maize retail price down and hence the producer price.

Rice prices have been set quite high compared with recent (1975 - 1977) world prices, around So.Shs. 200/q CIF Mogadishu, to encourage domestic production. As the World Bank is forecasting long term prices much nearer the domestic price for rice, it has been decided to continue using the same market price. The market prices for maize and rice, respectively, are assumed to remain at So.Shs. 75 and So.Shs. 350 (milled)/q at constant 1977 prices.

The border parity price based on the cost of importing maize has been calculated by taking the World Bank 1979 - 1985 price of US $ 129/t FOB Gulf (1977 constant prices US No. 2 yellow) equivalent to So.Shs. 100/q CIF Mogadishu. Handling and port charges at So.Shs. 25 give a price in Mogadishu of So.Shs. 125, less local transport of So.Shs. 6, gives a farm gate price of So.Shs. 119/q.

For rice, the long term World Bank price of $ 380/t for Thai, 10% broken FOB Bangkok (1977 constant prices) is taken, which is equivalent to a price of So.Shs. 264/q CIF Mogadishu. This is equivalent to a price of So.Shs. 344/q in Mogadishu or So.Shs. 338/q at the farm gate (see Table C.6).

TABLE C.6

Prices Assumed for the Economic Analysis of the Project

	Market price (So.Shs./q)	Economic price (So.Shs./q)
Maize	75	119
Rice(1)	350	338

Note: (1) Milled basis 65%.

C.2.7 Conclusions

Estimates of production plus imports fall far short of demand estimates for cereals both now and in the foreseeable future. Even if present importation levels of wheat (40 000 t) and rice (25 000 t) are used as a guide to production potential, the increased production of the feasibility area of 4 500 t of maize and 3 000 t of rice will easily be absorbed. If all the proposed plans are carried out for the Study Area, maize production will increase by 30 to 40 t and rice production by 15 to 20 000 t. Because of the time scale of implementation and the uncertainty of present statistics, it is reasonable to consider that these quantities could be marketed without too much trouble.

The long term prospects on the world grain market are never very certain but the present situation is far more settled than three to five years ago. The influence of a fall in the world's rice surplus with an accompanying firming of prices has been allowed for in the long term rice price.

C.3 Oilseeds

C.3.1 Production

Sesame is the most important oilseed grown in Somalia and it accounts for over 90% of the oilseed production. ADC has monopoly trading rights and all production of oilseeds must be sold there except for the household allowance of 30 kg per month which can be retained. A considerable quantity of sesame is processed locally, often within the village, and consumed there.

Production data are subject to a fair degree of error as a lot of sesame is never sold to ADC and data on area under these crops have only been estimated from the production figures. ADC purchases of oilseeds can be found in Table C.7 but these are estimated (IBRD 1977) to be about 50% of total production.

TABLE C.7

Purchases of Oilseeds(1) (tonnes)

	Sesame	Groundnut	Sunflower	Cotton seed
1973	12 431	700	-	-
1974	4 556	1 000	800	450
1975	8 000	1 000	800	450
1976	9 700	800(2)	700(2)	NA
1977	10 000	600(2)	NA	NA

Notes: (1) Estimated to be 50% total production of sesame, groundnuts and sunflower.

(2) Own estimate.

Source: ADC

The Ministry of Agriculture estimates that there was about 70 500 ha of sesame and 1 900 ha of groundnuts in 1977. About 50% of the country's sesame and 40% of the groundnuts are grown in the Lower Shabeelle area. There has been a tendency for groundnuts and sunflower areas to decline considerably over the last three years as growers have turned to other crops because of technical difficulties such as low oil yields, crop loss (birds) and harvesting problems.

C.3.2 Demand

Domestic demand for oilseeds is made up primarily of the demand for oil and secondly the demand for oilcakes. With the lack of accurate statistics within the country, estimation of domestic demand is difficult but the best estimate can be based on production plus import figures. Importation of vegetable oils and oilseeds (mainly groundnuts) is shown in Table C.8.

TABLE C.8

Importation of Oil and Oilseeds 1971-76 (tonnes)

	1971	1972	1973	1974	1975	1976
Oilseeds (groundnuts)	54	33	111	1	60	
Vegetable oil	5 545	5 438	3 796	2 674	4 993	
		(3 733)(1)	(2 585)(1)	(3 000)(1)	(8 450)(1)	(9 520)(1)

Note: (1) Foreign trading organisation figures

Source: Annual Abstract of Statistics 1975 and ENCE

There is a wide discrepancy between the Statistics Office figures and those of the foreign trading organisation from whom the figures should originate. These differences could possibly be explained by one set of figures lagging behind the others but overall accuracy being reasonable, or by one set of returns being taken from letters of credit which anticipate transactions which are not necessarily completed.

An estimation of consumption can be derived from these figures (see Table C.9). Cotton seed is not processed at the moment and we will assume an average extraction rate of 35% (because of local presses) from the other oilseeds.

TABLE C.9

Somalia: Estimates of Oil Consumption (tonnes)

	1975		1976	
	Seed production	Oil production	Seed production	Oil production
Local				
Sesame	16 000	5 600	19 000	6 650
Groundnuts	2 000	700	1 600	560
Sunflower	1 600	560	1 400	490
Imports				
Groundnuts	60	20	100	35
Vegetable oils		6 725(1)		7 600(1)
Estimated total oil consumption		13 605		15 335
1976/76		14 470		

Note: Estimated per capita consumption of oil is 4.1 kg per year.

(1) Average of State Planning Commission and ENCE statistics. (These figures are only indications of magnitude.)

It is clear that about 50% of Somalia's vegetable oil is imported and that, although average consumption per capita of oil at 4.1 kg per year is fairly high, it is safe to assume a 3% per annum growth in demand, mostly accounted for by population growth. If present 1976 consumption is assumed to be 15 000 t of oil, then 1986 consumption would be 20 000 t and 1996 consumption 27 000 t, an increase of 12 000 t in 20 years.

It is virtually impossible to estimate the demand for oilseed cake but this will only affect cake pricing, not the overall pricing and demand structure.

C.3.3 Balance of Supply and Demand

Tables C.8 and C.9 illustrated a heavy (50%) import dependency in vegetable oil. With the forecast increase in demand there will be a 19 to 20 000 t deficit in 20 years' time. This is equivalent to a requirement of 57 000 t of sesame at 35% extraction, which at improved yields of 10 q/ha would require an extra 57 000 ha.

The Study Area within the Lower Shabeelle region has a surplus of sesame and the excess is sent to Mogadishu oil mill, therefore any further increase in supply will also go to Mogadishu.

C.3.4 Prices

The development of producer prices is shown in Table C.10. The price is controlled by the Government.

TABLE C.10

Producer Prices for Sesame (So.Shs./q)

	1973	1974	1975	1976	1977
Producer price at farm gate	155	180/200	200	200	200

Source: ADC

There is nothing in Government policy to indicate that 'real' price levels will change, so the existing price of So.Shs. 240/q has been taken as the market price for this project.

The world market for groundnuts, soya beans and other oilseeds has recovered from the severe shortages of 1974 when prices more than doubled. Possibly there will be a slight surplus situation into the 1980s when prices will tend to fall, after which the World Bank forecasts a price very similar to 1975/76 level (at constant prices).

As a basis for the economic price of sesame, the price is taken as similar to CIF 1975/76 Yemen at US $ 420/t. This is equivalent to CIF Mogadishu So.Shs. 264/q. Plus handling and less local transport, this is equivalent to So.Shs. 250/q at farm gate.

C.3.5 Conclusion

Somalia is likely to be importing considerable quantities of vegetable oil for the foreseeable future and the proposed increase in production of 5 000 t in the feasibility area will easily be absorbed. As far as the whole Study Area is concerned, with full development the sesame production might increase by 30 000 t but this is stil well within the 57 000 t estimated to be required in 20 years.

Market price is taken as So.Shs. 240/q and border parity price of So.Shs. 250/q.

C.4 Cotton

C.4.1 Production

There is one textile mill in Somalia run by 'Somaltex' (autonomous cotton textile production and processing enterprise) at Balcad. All domestic cotton fibre is purchased by this state agency, and the best estimate of the country's production is obtained from their purchasing figures, as there is no reliable information on the country's cultivated area, see Table C.11. In 1976 Somaltex processed approximately 192 t of Somali cotton fibre - amounting to about 580 t seed cotton. The majority of cotton production is on peasant smallholdings with uncontrolled irrigation with very irregular yields. Yields are about 300 kg/ha which means that production came off about 2 000 ha in 1976. 1977 figures were not available but it can be assumed that the increase in price (30%) will have encouraged some expansion.

TABLE C.11

Cotton Lint Purchases of Somaltex

	Total purchases		Somali production			Imports (1) (2)		
	'000 kg	Cost ('000 So.Shs.)	'000 kg	Price/ kg (So.Shs.)	Cost ('000 So.Shs.)	'000 kg	Price/ kg (So.Shs.)	Cost ('000 So.Shs.)
1973	752	3 984	222	5.15	1 144	529	5.36	2 839
1974	600	3 545	174	6.13	1 069	426	5.87	2 476
1975	386	2 506	259	6.73	1 743	107	7.12	763
1976	842	6 520	192	7.00	1 341	651	8.05	5 239

Notes: (1) 1973, mostly from Uganda; 1974 onwards, all from Tanzania.

(2) It appears that this price excludes all handling charges. These have now been imposed in 1978 at 20% and import duty at 30%.

Source: Somaltex.

The production of cotton under controlled irrigation is very limited and has tended to decline rather than expand. In 1976/77 three enterprises were involved in cotton production, two of which have since ceased.

(i) Afgooye Mordiile seems to have produced about 7 t of seed from 24 ha and has since discontinued.

(ii) The Seed Multiplication Unit, Afgooye, is estimated to have produced 15 t of seed from 50 ha. Cotton has now been discontinued.

(iii) Balcad (subsidiary of Somaltex). Project started in 1977 and is estimated to have grown about 300 ha cotton. Yield is given by the Director as 1 000 kg/ha but this is possibly a little generous so 900 kg/ha is assumed giving an output of about 270 t seed cotton.

The main problems encountered in cotton growing on these projects were poor pest control and lack of qualified skilled and semi-skilled workers.

Estimated total seed production in 1976/77 allowing for better rains in rainfed areas would amount to about 770 t of seed cotton, equivalent to 260 t of fibre.

Production volume over the next 10 or 20 years is very difficult to estimate because, although many proposed projects have cotton components, the rate of implementation and strength of the commitment is difficult to ascertain. Based on committed projects it would not be unreasonable to expect about 7 000 ha to be in production in 10 years time. As many of these projects are considered as state farms and the average yield has been estimated as about 1 000 kg/ha, which would produce about 7 000 t seed cotton. This is equivalent to about 2 400 t of fibre.

C.4.2 Demand

The domestic demand for cotton fibre in Somalia is all served by Somaltex. It has been estimated from various sources that the total demand for textiles is made up of 70 to 80% imports which are given a higher preference than local products. Unfortunately trade statistics do not clarify this situation. Somaltex processed about 850 t of fibre in 1976 and by 1977 had a completely re-equipped factory with a potential output of 20 000 yards, equivalent to 2 250 t of cotton fibre, which is at present only being used at about 40% capacity.

The total textile demand in the country at present is about 4 500 t of cotton fibre per year and the demand at maximum utilisation of existing mill capacity would be 2 250 t cotton fibre.

C.4.3 Balance of Supply and Demand

At present local cotton is providing about 10% of the Balcad mill's existing capacity, and less than 5% of the country's textile demand. There are considerable possibilities for import substitution provided management levels improve, the quality of the cotton seed is raised (there is strong pollution of the Somali cotton, leading to breakdowns in the mill) and the field problems, such as pest control, are overcome.

C.4.4 Prices

Government policy on pricing is intended to encourage production, particularly over the last three years when prices have doubled (see Table C.12). ADC buys the cotton and delivers it to Balcad direct or, in the Juba area, it is first ginned and then delivered to Balcad. ADC is paid So. Shs. 775/q for ginned cotton delivered.

TABLE C.12

Producer Prices of Seed Cotton 1971-77
(So. Shs./q, ex farm)

	1971	1972	1973	1974	1975	1976	1977
Seed Cotton							
Grade I	130	130	130	130	200	200	260
II	120	120	120	120	160	160	240
III	100	100	100	100	120	120	220
IV	70	70	70	70	70	70	-
Cotton Seed	20	20	20	20	20	20	-

Somaltex buys cotton fibre on the world market, mainly from Tanzania, to keep the mill supplied. Recent prices that have been paid are shown in Table C.13 but this period coincides with a period of very high world prices, which have been caused by increased demand, probably due to favourable upturn in economic activity of 1975/76, and a period of poor production levels (Table C.14) which

have in turn reduced world stocks considerably. The low production figures were due not to low cropping areas but to droughts in various important growing areas. The outlook is that supply and demand will probably tend more towards a balance in the long run particularly as cotton demand is very sensitive to price because it is highly substitutable. Also supply reacts rapidly to short term price fluctuations, as compared with perennial crops, for instance coffee.

TABLE C.13

Average Prices Paid for Cotton Lint 1976-78 (C&F)

	Cents/Cbs	So. Shs./kg	Raw cotton equivalent (So. Shs./kg)
1976	84	11.60	3.87
1977	83.30	11.53	3.84
1978(1)	82.25	11.39	3.80

Note : (1) First three months

Source : Somaltex

The World Bank forecast a long run price of 66.5 cents per lb (constant 1977 dollars) for Mexican SM $1^{1}/_{16}$ inch CIF North Europe.

TABLE C.14

World Cotton Production and Consumption 1965-77

	Million bales (478 lb net)				
	1965/66	1970/71	1974/75	1975/76	1976/77
World production	53.2	54.4	63.6	54.6	57.7
Stocks	28.0	21.8	25.1	30.6	22.5
TOTAL	81.2	76.2	88.7	85.2	80.2
Consumption	50.8	56.2	58.4	62.8	61.3
Balance production over consumption	2.4	-1.8	5.2	-8.2	-3.6

Source : ICAC Monthly bulletins

C.4.5 Border Parity Price

It is assumed that the price CIF Mogadishu of $1^{1}/_{16}$ inch Presley test 90/100 will be 66.5 cents/lb. This is equivalent to So. Shs. 9.2/kg. Handling costs and transport to mill make a price of So. Shs. 11.05/kg at the mill. As the market for increased seed is very difficult to assess and is probably poor even if taken for oil (only So. Shs. 20/kg) it has been discounted. Ginning costs are estimated at So. Shs. 0.27/kg, so at a ginning out of 30%, the equivalent price at mill would be So. Shs. 3.23/kg, less local transport, giving a farm gate price of So. Shs. 3.20/kg.

C.4.6 Conclusions

Somalia has one state owned cotton mill at Balcad with a possible output of 20 000 yards which is equivalent to 2 250 t cotton fibre. The mill is working at 40% capacity at present and of this only about 200 t fibre are grown in Somalia (30%). Consequently there is considerable room for local expansion of cotton growing as an import substitution crop, and the maximum output of the Project Area, about 1 200 t of cotton fibre, can easily be absorbed. The total present demand for textile fibre is about 4 500 t and this is likely to increase by at least 3% per annum.

A market price of So. Shs. 2.50/kg for seed cotton is assumed, and a border parity price of So. Shs. 3.20/kg is assumed for the economic price.

C.5 Bananas

C.5.1 Production

As with all the crops grown in Somalia, actual production statistics for bananas are unreliable or non-existent, but as bananas are grown mainly for export a reasonable estimate of production can be made from the export figures. Table C.15 shows how a fairly continuous growth of production first peaked in 1964 (at over 100 000 t) and then again in 1972 (at nearly 140 000 t) after which there has been a considerable decline to 54 000 t in 1977. Bananas are grown in two areas, one on the Shabeelle river, mainly in the Study Area, and the other on the Juba river. In the 1950s about 70% of the banana production came from the Shabeelle area but this has fallen to below 50% since the mid 1960s. Table C.16 gives a summary of the present situation, with the number of farms and the area under bananas divided into those in production and those not yet in production. The last set of data gives an indication of the future trend in production, which is still apparently declining. The banana industry in Somalia is facing considerable problems at the moment, both technical and economic, which are fully covered in Annex IV, leading to the declining yields described in Section 11.9 of that annex and hence to the declining hectarage, because of low profitability.

The Study Area produces 87% of the bananas grown in the Lower Shabeelle region amounting to about 3 895 ha, exporting 72 531 t and 53 812 t, respectively, in 1976 and 1977. It was estimated from the farm survey (Annex IV) that only about 65% of the production is exportable (1976 data) representing an average yield /ha of 20 t of bananas (1976 data are used because of large disruptions in the export market in 1977, described in Section C.5.2). Assuming this yield of 20 t/ha, total recent banana production would be about 140 000 t with about 49 000 t available for the home market and wastage. There is no information

TABLE C.15

Banana Exports 1950-77 (tonnes)

Years	Net tonnes	Index numbers(1)
1950	17 496	22
1951	25 153	32
1952	31 399	40
1953	30 640	39
1954	40 815	52
1955	45 605	59
1956	32 860	42
1957	39 082	50
1958	50 337	65
1959	54 139	70
1960	76 854	100
1961	78 538	102
1962	77 234	101
1963	97 184	126
1964	102 847	133
1965	98 828	128
1966	94 244	122
1967	84 814	110
1968	86 585	112
1969	92 818	120
1970	102 844	130
1971	103 315	134
1972	133 935	174
1973	111 931	146
1974	107 299	140
1975	81 841	107
1976	72 531	94
1077	53 812	70

Note: (1) 1960 taken as base year.

Source: National Banana Board annual statistics 1977.

TABLE C.16

Banana Production - Number of Farms and Area, 1971-77

No. of farms

	1971	1972	1973	1974	1975	1976	1977
Shalambood	73	81	67	66	57	48	49
Kismaayo	63	64	72	74	72	68	73
Total	136	145	139	140	129	116	122

Area cultivated (ha)

	1971	1972	1973	1974	1975	1976	1977
Shalambood	3 400	3 917	4 700	4 695	4 209	3 897	3 895
Kismaayo	3 761	4 205	4 428	4 057	3 133	3 434	2 488
Total	7 161	8 121	9 128	9 770	7 342	7 422	6 383

Area in production (ha)

	1971	1972	1973	1974	1975	1976	1977
Shalambood	2 292	2 194	3 236	3 097	2 726	2 535	2 658
Kismaayo	2 903	3 344	3 901	3 956	3 995	2 693	1 889
Total	5 195	5 538	7 137	7 054	6 721	5 319	4 547

Area not yet in production (ha)

	1971	1972	1973	1974	1975	1976	1977
Shalambood	1 108	1 725	1 464	1 616	1 237	1 362	1 237
Kismaayo	857	861	526	1 119	1 038	741	599
Total	1 966	2 585	1 991	2 734	2 268	2 103	1 836

Source: National Banana Board annual statistics, 1977.

available on the possible size of the home market or on wholesale prices which might indicate tendencies to oversupply. There were about 15 000 t more bananas available in the second half of 1977 when Middle East shipments stopped but there were no reports of large dumping or unharvested bananas. This tends to indicate that the home market beforehand was not fully supplied but the evidence is rather sketchy.

C.5.2 External Trade

The traditional market for bananas exported from Somalia has always been Italy. Until the end of the 1960s all exports were taken by Italy but more recently the Middle East has been taking around 45 000 t a year (see Table C.17) until the last two years when exports fell and then stopped altogether in mid-1977, due to repudiation of the Middle East contract. The table illustrates the varying importance of the Middle East market over the last few years. A new agreement to export bananas to the Middle East for six months was signed on 23 April 1978, but proposed quantities are unknown. ENB maintain that their bananas are too expensive on the old Middle East market and a trial ship sent in February lost money. It is suspected that quality is also a problem, there being too many bruised or damaged bananas in the consignments, and the lack of shipping permanently contracted to the Middle East run aggravates the delivery problems.

TABLE C.17

Banana Exports by Destination 1962-77 ('000 t)(1)

Year	Italy	%	Middle East	%
1962	77.2	100	-	-
1963	97.2	100	-	-
1964	102.8	100	-	-
1965	98.8	100	-	-
1966	94.2	100	-	-
1967	84.8	100	-	-
1968	86.6	100	-	-
1969	86.3	93	6.5	7
1970	84.4	84	15.8	16
1971	75.8	73	25.5	25
1972	78.4	59	45.6	34
1973	66.0	59	46.0	41
1974	40.3	38	67.0	62
1975	36.6	43	45.2	55
1976	45.3	58	27.2	38
1977(2)	46.4	86	7.4	14

Notes : (1) In 1971 and 1972 quantities were exported to East Germany (2 000 and 10 000 t, respectively)

(2) No bananas sent to Middle East after May 1977 as contract repudiated.

Source : National Banana Board statistics 1977.

C.5.3 World Supply and Demand

World production and trade in bananas is illustrated in Table C.18 which also indicates the key exporting and importing countries. Although world production has increased steadily, exports after 1972 have shown a slight downward tendency. There is very clear domination of the market with three quarters of the trade being exported by six countries and imported by seven. Somalia has only a small share of the world market at 1.5% but supplies between 12 and 25% of the Italian market (12% recently).

TABLE C.18

World Production and Trade in Bananas (1970-77) ('000 t)

	1970	1971	1972	1973	1974	1975	1976	1977
Production	N/A	N/A	34 840	35 221	36 871	37 012	38 388	40 231
Exports	5 803	6 535	6 750	6 760	6 574	6 641	N/A	N/A

Key Exporting Countries

	Approximate percentage of world total (1971-76)
Ecuador	21
Costa Rica	15
Philippines	12
Honduras	11
Panama	6
Guadaloupe/Martinique	5
Somalia	1.5
	71

Direction of Imports

	Percentage of total world imports
Europe (70% France, Germany, Italy, UK)	40
USA and Canada	36
Japan	15

Source : FAO Trade Yearbook, 1975.

Monthly Bulletin of Agricultural Economics and Statistics 1976 and 1977.

The prospects on the world market are not clear, particularly as exports have been declining recently. However, despite this, Europe has been importing increasing quantities with sharp increases by the smaller European countries. Also, the Middle East market has expanded from about 48 000 t in 1970 to 168 000 t in 1975, Iran, Kuwait and Syria showing the most significant increases, which are the nearest market for Somalia. Although competition will have increased because of other declining markets, notably South America, Somalia is well placed to expand exports if she wishes to.

C.5.4 Prices

Prices of bananas on the world market remained fairly static from 1969 to 1972/73. From 1973, there has been a considerable upward movement in prices. Import prices into Germany and the USA have been taken as indicators of the world market price (Table C.19).

TABLE C.19

Import Prices of Bananas - USA and Germany
(US cents/kg)

	Federal Republic of Germany		USA
	I	II	III
1969	12.5	13.1	16.0
1970	14.6	15.5	16.8
1971	16.0	15.0	14.0
1972	15.1	15.5	16.2
1973	19.2	17.2	16.4
1974	24.5	22.2	18.4
1975	29.7	26.7	24.3
1976	27.3	25.5	25.7
1977(1)	31.8	NA	29.9

Notes : (1) January to May

I Price paid to importers for Hamburg in cartons - Colombian to June 1972 then Central American.

II Price paid to importers for Hamburg in cartons - Ecuador.

III Central and South American Green FOB port of entry.

Source : Monthly Bulletin of Agricultural Economics and Statistics, FAO.

Prices achieved in Italy for the Somali bananas compared with other sources are shown in Table C.20 which shows the poor prices achieved compared with United Brands, who have about 40% of the Italian market.

TABLE C.20

Prices of Bananas Imported into Italy - Wholesale
(lira/kg)

	1973	1974	1975	1976	1977
SMO (Somalia)	245	258	344	402	463
GF (United Brands)	283	278	374	425	486
Comafrica (Standard Fruit)	265	268	355	401	450
Pacific Fruit	261	265	361	411	453

Source : ENB

The development of the unit value of exports from Somalia over the last six years is shown in Table C.21 and the new contract prices at So. Shs. 1 353/t for the Middle East show some improvement on 1977 prices.

TABLE C.21

Export Unit Value FOB
(So. Shs./t)

Year		Index
1971	619	100
1972	584	94
1973	604	98
1974	686	111
1975	989	160
1976	1 217	197
1977	1 232	199

Prices vary a little depending on the market for which the fruit is destined, but the fixed producer price in 1977 was So. Shs. 1 200/t FOB. As the prices have appeared reasonably competitive on the market and a new contract has been negotiated for more than this in 1978, the existing 1977 price will be used as the base for the economic and financial price for the analysis (1977 prices). Farm to FOB costs are estimated at So. Shs. 700/t including So. Shs. 450 (ENB) for cartons. This gives a financial farm gate price of So. Shs. 500/t. For the economic pricing, cartons will only be costed at So. Shs. 240 (the price at which they could be imported) and this gives an economic farm gate price of So. Shs. 710/t.

C.5.5 Conclusions

Banana production is an important export commodity for Somalia, comprising 10% of the total value of exports. Production has been falling because of low profitability but there appears to be no reason why increased quantities of bananas cannot be marketed on the world market if adequate effort is put into the production and marketing. The existing FOB price of So. Shs. 1 200 will be taken as the economic and financial price used in the analysis giving a producer price of So. Shs. 500/t and an economic farm gate price of So. Shs. 710/t.

C.6 Grapefruit

C.6.1 Introduction

Grapefruit is included in the market survey because there is a proposed grapefruit project of some 1 400 ha within the Study Area which has already been started. A detailed market survey was carried out for this project in 1973 and published by the consultants (Citaco 1974). However data from 1971 were used for the market survey. The report is now out-of-date and the world market has changed, as have the relationships between production costs and returns. It is beyond the scope of this report completely to revise Citaco's economic work besides the fact that, as a committed project, there is no question of including it in the economic ranking for the Master Plan. The only question which is raised and discussed at length in Annex VI is whether the project is practical. The purpose of this brief survey is to give the present background for the project, which should encourage a further study to provide a sound basis for future decisions.

C.6.2 Production and Marketing

Estimates of grapefruit production in Somalia vary considerably, which is inevitable, as most of the production comes from holdings of only one or two hectares. The FAO estimates about 400 ha per year have been grown for the last 15 years, giving a production of about 4 000 t. This yield of 10 t/ha is much higher than Citaco (1974) estimates of 5 to 8 t/ha in the Project Area. They estimated that total annual production was nearer to 1 500 t.

The land use survey, 1977, found about 200 ha of grapefruit in the Study Area (excluding the new scheme for which nothing has been planted yet) and this represents about 50% of the country's production, the other areas being at Afgooye and on the Juba river.

Between 1960 and 1970 an estimated 233 to 389 t per year of grapefruit were exported to Italy but this declined, and ceased altogether in 1974. All present production is sold locally for either direct consumption or fruit juice preparation in local cafes and hotels. No reliable market information or reasons for exports stopping are available, although poor external quality of fruit was probably a major factor.

C.6.3 World Production and Trade

World production of grapefruit has doubled in 10 years and is now a little over 4 million tonnes per annum. The overall trend in production has been up, except for a slight falling back in 1975 (mainly in the USA) which has since recovered. The United States has consistently produced about two-thirds of the world production (see Table C.22).

TABLE C.22

World Grapefruit Production and Trade
('000 tonne)

	1972	%	1973	%	1974	%	1975	%	1976	%
World production	3 515		3 674		3 826		3 630		4 009	
From USA	2 380	68	2 428	66	2 442	64	2 271	63	2 585	64
World exports	627		672		696		732		770	
From USA	188	30	194	29	226	32	252	34	NA	
From Israel	208	33	251	37	220	32	269	37	NA	

Source : FAO Production Yearbooks
Monthly Bulletin of Agricultural Economics and Statistics

World trade in grapefruit has reached about 700 to 800 thousand tonnes and has never been more than a fifth of the total world production. The USA and Israel are the main exporters accounting for between 63 and 70% of the total world trade. The position of the USA in the world market can be crucial as they are only a residual exporter (10% of their production) and are therefore easily likely to influence the market with variable supplies. Main exporters besides Israel are Cyprus, Swaziland and South Africa.

The majority of grapefruit exports are taken by Japan (22%), UK (15%), Germany (15%), France (12%) and Canada (12%) with the Italian and Dutch markets expanding considerably recently.

The FAO expects world citrus supplies to outstrip demand until at least the early 1980s although this will apply less forcibly to grapefruit, than to other citrus fruits. There is a very important difference between seasons, the June to September period being the low season in Europe with South Africa and Swaziland dominating the market.

C.6.4 Marketing and Export Possibilities

The demand for grapefruit in Europe is for high quality blemish-free fruit, and producer experience has shown (in South Africa and Swaziland) that a high proportion of fruit per tree needs to be of first grade to make export to Europe a paying proposition. The market is competitive and brand identification is a more important sales factor than with any other fruit except perhaps bananas.

There can be a considerable price differential between branded and non-branded sales. Grapefruit grown in Somalia are of a mottled and greenish colour due to ripening at high temperatures which gives them a poor external appearance although the juice is usually of good flavour.

There is a market opportunity for Somali grapefruit in the low season in Europe from June to September, but there are also some serious difficulties of market entry, as described above. The prospects for a non-branded poorer looking fruit, requiring a high level of management, on the high quality brand-loyal European market, which is also very susceptible to supply fluctuations, is not good. Also the quantities that were anticipated for export (1 500 t with 50% in the low season) could have a serious effect on the market and therefore the price. This output represents 10% of European imports in this period or 45% of the UK market.

A market that should be explored further is that of the Middle East where rising incomes and proximity might well prove it to be of greater potential.

C.6.5 Prices

Internal prices for grapefruit are varied and information is scant. The agricultural survey established that farmers in the Study Area were averaging So. Shs. 50/q over a year (1977) for fresh grapefruit.

Wholesale prices of grapefruit in the United States and the United Kingdom have been taken to indicate the basic world price movements (see Table C.23). The difference between the South African low season price and the lower Israeli price should be noted. In 1977 figures for Israel cannot be taken as representative as they are for only two months, although they are at 50% of previous years' prices. There is no apparent reason for this large fall.

As can be seen, prices over the last six or seven years have remained fairly static. The 1977 CIF average price of £160/t (Board of Trade) is taken as the base price; less freight, local transport and customs gives a farm gate price of So. Shs. 100/q.

C.6.6 Conclusions

The world grapefruit market is a fairly specialised market, with the USA and Israel sharing 70% of the world trade. Brand loyalty is high and the requirements of a high quality fruit in Europe makes it difficult for a rough skin variety such as that grown in Somalia to enter the market.

It would appear wise, particularly as real world prices have been falling steadily for grapefruit since 1973, for a comprehensive market survey to be executed to complement the Citaco report.

An estimate for a fresh grapefruit price FOB Mogadishu for Europe is So. Shs. 100/q.

TABLE C.23

Wholesale Prices of Grapefruit 1969-77
(US cents/kg)

	United Kingdom		United States
Length of season	8 months	6 months	10 months
Period :	October to May	May to October	November to August
Year	I	II	III
1969	18.1	31.6	18.0
1970	21.9	31.4	19.1
1971	25.4	43.5	18.1
1972	25.7	33.5	20.4
1973	26.0	36.8	17.1
1974	27.2	37.5	16.4
1975	27.0	45.6	17.9
1976	27.9	32.9	20.5
1977	26.7(1)	17.4(2)	17.9(3)

Notes : I Israel net weight wholesale price London

II South African net weight price paid by retailers to wholesalers in England and Wales

III Florida, auction price New York

(1) January - June

(2) May - June

(3) January - May

Source : Monthly Bulletin Agricultural Economics and Statistics
FAO 26 : 7/8 1977 and 24 : 3 1975

C.7 Livestock

C7.1 Introduction

A comprehensive review of the livestock industry has recently been completed (Hunting Technical Services Ltd., 1977) and an outline of the national livestock industry covering government policy and livestock management, marketing and processing is covered in Annex V, Chapter 1. The considerable importance of livestock to the country, as the largest industry and largest export producer, coupled with the relatively minor importance of the livestock development in the proposed project, has meant that this section on livestock cannot do justice to the industry.

C7.2 Production

The national herd is estimated to be approximately 2.5 million cattle, 15 million sheep and goats and 2.5 million camels. It is further estimated that due to migration to Kenya and Ethiopia, during hte gu and der rainy seasons, the population is reduced to about 1.5 million cattle, 10 million sheep and goats and 2 million camels. The vast majority of the stock is managed within a nomadic system of management, with considerable movements of animals between seasons.

The distribution of animals over the country is quite marked with 80% of the cattle but only 20% of the sheep and goats in the south of the country ('south' refers to areas south of the Shabeelle river, and includes the Study Area). The importance of cattle relative to small stock in the Study Area is shown in Table C.24 where it can be seen taht cattle form over 70% of the livestock population in the Study Area. It is also important to note that the cattle in this area are mainly kept for milk production and the majority of this is consumed by the families. Total annual production of milk and offtake of animals for the Study Area and project area are estimated in Table C.25, but estimates for the country as a whole would be too unreliable.

TABLE C.24

Estimated Present Livestock Population ('000 head)

	National	South(1)	Study Area	Qoryooley
Area (km^2)	630 000			6
Cattle	2 500	2 000	66	4.5
Sheep and goats	15 000	3 000	24	1.6
Camels	2 500	1 200	2	0.2
% Cattle/cattle and small stock	14%	40%	73%	74%
% Cattle/all stock	12.5%	32%	72%	71%

Note: (1) South is the area south of the Shabeelle river

Source: IBRD Estimates Livestock Survey

TABLE C.25

Estimated Annual Production of Milk and Animals in the Study Area

	Study Area	Project Area
Milk ('000/l)	3 875	2 667
Cattle	4 725	325
Sheep and goats	2 457	156

It is estimated that about 50% of the sheep and goats are slaughtered and consumed at home, but that most of the cattle are sold for slaughter. The best estimate for total annual production is given in Table C.26 (Source: Livestock Sector Review, HTS, 1976).

TABLE C.26

Estimated Annual Offtake in 1975 ('000 head)

		Sheep and goats	Camels	Cattle
1.	Total Population	15 000	2 500	2 500
2.	Domestic Demand			
	Municipal slaughter	454	56	61
	Private slaughter	743	47	29
	Sub-total	1 197	103	90
3.	Net Inflow/Outflow			
	Live export	1 536	34	40
	Inflow from Ethiopia	-300	-10	-30
	Inflow from Kenya	-	-	-20
	Outflow from Kenya	-	-	17
	Slaughter for canning (1)	-	-	48
	Sub-total	1 236	24	55
4.	Total offtake	2 433	127	145
5.	Percentage offtake	16.2	5.1	5.8

Note: (1) Virtually all the canned beef is exported

Although accurate census figures do not exist, the export figures for animals, discussed later in Section C.7.3, show that there has been a comparatively rapid increase in livestock exports since 1968, three times for cattle and thirteen times for camels.

Although some of this increase is due to an increased flow of stock from Ethiopia it is also a reflection of the growing stock population within Somalia.

C.7.3 Marketing

The majority of livestock sales and purchases are undertaken by the private sector with the official government agency, the Livestock Development Agency (LDA) also taking an active part.

In northern and central Somalia there is a fairly well developed marketing system, geared mainly to the supply of stock for export. In the southern region where the private export of livestock is banned and where the emphasis is on cattle rather than export livestock, marketing is relatively undeveloped. Most of the attention in this section will be given to the southern region as it is there that the project is sited.

Most stock in the south are marketed through either the small auction markets in the towns or, in the case of cattle, through the LDA controlled markets where stock are bought on a fixed price basis to supply the only meat processing factory at Kismaayo.

Important factors influencing the marketing in the southern region are:

(i) Unrealistically high prices paid by the LDA have involved them in losses and caused an oversupply to the factory. Now, however, the price relationships have reversed (see Section C.7.7).

(ii) Higher cost of sea transport to the export market of Saudi Arabia is (50% above that from Berbera) and poor shipping facilities in the south.

(iii) Government fixed minimum export prices which should be lower than Berbera are in fact some 80% higher.

These factors have precluded the development of the export market in the south, but with a change in policy this could be encouraged.

Hides and skins are marketed through the Hides and Skins Agency (HASA) which in turn is responsible for all exports of hides and skins. Details of their level of exports are shown in Section C.7.5.

C.7.4 Supply and Demand

Various estimates of the demand for meat have been made in the country as a whole (ILO, 1977; UNIDO, 1976; Huntings, 1976) but based on fairly poor statistics. Due to the considerable differences in eating habits of different sections of the population (particularly between nomads and cultivators) it was felt that concentrating on the Study Area where some survey work has been done would be of greater value.

TABLE C.27

Total Exports of Live Animals according to Livestock Development Agency

	Cattle		Sheep		Goats		Camels	
	Head	Index	Head	Index	Head	Index	Head	Index
1971	58 528	100	622 253	100	563 630	100	26 090	100
1972	81 328	139	816 483	131	819 296	145	21 954	84
1973	68 088	116	709 165	114	675 295	120	29 561	113
1974	31 472	54	663 100	107	575 348	102	23 965	92
1975	39 883	68	793 102	127	743 059	132	34 233	131
1976	58 385	100	384 911	62	381 106	68	33 502	128
1977	54 596	94	465 005	75	461 265	82	33 296	128

Source : LDA and IBRD 1977

The Livestock Annex (V) calculated that the average daily consumption of meat was 15 g per head per day (from estimated slaughter figures) compared with the national average for rural, non-nomadic, population of 80 g per person per day given in the Livestock Sector Review (Huntings, 1976). This figure assumes that there is no importation of meat (not livestock) into the area and does not include poultry. It was also noted in Annex V that there appeared to be a healthy demand for meat demonstrated by the speed of butcher's selling, and apparent unsatisfied demand.

At present it is estimated that the Study Area is producing about 4 million litres of milk which is equivalent to about 33 l per person per year which is fairly low. It would not be unreasonable to expect the demand to be at about 100 l per year with a reasonable price and ready availability (the majority is autoconsumption anyhow).

C.7.5 Exports

Total exports of live animals according to the LDA are illustrated in Table C.27. The drought years of 1974 and 1975 had a considerable effect on the small stock, enforcing first increased sales, and then in 1976 and 1977 cut back in sales to permit restocking. The effect on the cattle exports was more immediate, but recovery has been better, probably because a smaller proportion of the total population is involved.

The trade in hides and skins is shown in Table C.28 showing the considerable increase in export value recently, although the discrepancy between HASA and SPC statistics is quite large.

TABLE C.28

Production and Trade in Hides and Skins (million So. Shs.)

Exports of Hides and Skins 1967 - 77

	1969	1970	1971	1972	1973	1974	1975	1976	1977
Hides	1.7	2.5	5.8	6.5	4.2	2.6 3.2	6.6 3.7	4.2	
Skins	15.3	12.3	12.3	10.5	9.0	11.0 12.0	19.2 19.5		
Total	17.0	14.8	18.1	17.0	13.2	13.6 15.2	25.8 23.2	42.6	53.0
					By weight				
Hides	0.84	1.32	3.06	2.36	1.32	0.41 0.49	1.00 0.70	1.15	1.5
Skins	2.80	3.02	2.87	2.55	2.06	0.60	1.18		
Total	3.64	4.34	5.93	4.91	3.38	1.01	2.18		

Source: Annual Abstract of Statistics, 1975 HASA

Estimated Trade in Hides and Skins 1976

	Export production (No.)	Estimated domestic production (No.)	Domestic as percentage of export
Sheep and goats	4 200	1 197	28.5
Cattle	680	138	20.3
Camels	230	103	44.8

Note: (1) HASA information

Source: Huntings (Livestock Sector Review)

C.7.6 World Market Prospects

Only a brief summary of the present prospects is given, bearing in mind that the majority of Somali livestock exports are on the hoof and are taken by the Middle East.

The FAO estimates that after three years of relatively rapid growth in world meat production, the cattle cycle has passed its peak and there is now a cyclical decline of beef production in Western Europe and North America. A marked reduction in Australian slaughterings is forecast with a smaller decline in Argentina, another important beef exporter. World mutton supplies are also lower, Australia's reduction being an important contributory factor.

However, although Somalia has a large livestock export trade it is very regional, that is, the Middle East is the sole importer. This market is still expanding quite rapidly and competition is limited to Australian imports. The Livestock Sector Review found that there should be an adequate potential market for Somali livestock exports in the future with the prospects for live cattle less favourable than those for sheep and goats. It was also thought that real prices would at least be maintained, if not show a slight upward tendency.

C.7.7 Prices

Prices received for livestock sold in Somalia over the nine years up to 1976, including the export prices, are shown in Table C.29. More recent statistics could not be obtained. However, estimates made in Annex V are reprinted in Table C.30 showing the approximate range of prices for various animals.

TABLE C.29

Average Prices of Livestock 1968 - 77 (So. Shs.)

	'000 head	Average price/head	National price/head	National price/head
1968	33.6	202	-	-
1969	32.6	201	-	-
1970	46.0	175	-	-
1971	58.4	124	-	-
1972	56.3	268	108	94
1973	41.3	406	313	115
1974	37.7	440	340	-
1975	19.3	380	270	123
1976	N/A	N/A	772	236

Source: Annual Abstract 1975
SPC/UNDP September 1977

Average FOB Prices for Live Animals (North Somalia) (So. Shs.)

	Cattle	Sheep
1969	344	79
1972	289	80
1974	799	127
1975	881	100
1976 (6 months)	1 308	342
1977	1 246	218 - 312

Source: SPC/UNDP September 1977.

TABLE C.30

Livestock Prices

Class of stock	Price (So. Shs.)
Cattle	800 to 1 500
Camels	3 000 to 3 500
Sheep	250 to 350
Goats	200 to 300
Donkey	500 to 600
Chicken	8 to 14

Note: See Annex V, Table 4.4

LDA fixed prices are So. Shs. 2.50/kg liveweight for male cattle and So. Shs. 2.30/kg for females. At an average weight of 215 kg this means an average purchase price of So. Shs. 516.

This price is considerably below the free market price and this is causing a large shortfall in supply to the meat processing factory. It is possible that the high market prices are partly due to the drought, as they are presently above export prices. It is assumed that these prices will fall slightly.

Prices and values assumed for the analysis are shown in Table C.31.

TABLE C.31

Livestock Values Assumed (So. Shs.)

	Present	Feedlot	General improvements
Cattle (as value)	800	950	900
Small stock	250	300	275
Milk (litre)	2	2	2
Eggs			60 cents

C.7.8 Conclusions

It is anticipated that the increase in livestock and milk production within the Study Area can probably be absorbed within the area because of low present consumption figures. If not there is a ready market for the small surplus in Mogadishu. A harmonising of pricing of the LDA with local free market prices and the export market would encourage production and make livestock more profitable. Increasing egg production in the area for household consumption is beneficial as it raises the value of the household diet but large increases of eggs put onto the market may well flood the market as the indications were that they are not scarce.

APPENDIX D

QORYOOLEY PROJECT CASH FLOWS

TABLE D.1 (cont.)

Goryooley Project Cash Flow - Basic Assumption

('000 So. Shs.)

Year:	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
With Project															
Revenue															34 281
Variable costs															9 052
Net revenue															25 229
Without Project															
Revenue															5 647
Variable costs															209
Net revenue															5 438
Benefits															
Gross revenue															
Net benefit	19 791	19 791	19 791	19 791	19 791	19 791	19 791	19 791	19 791	19 791	19 791	19 791	19 791	19 791	19 791
Project Costs															
Capital	1 039	966	194	772	678	674	664	6	2 065	1 002	1 227	801	311	717	374
Operation and maintenance	3 117	3 117	3 117	3 117	3 117	3 117	3 117	3 117	3 117	3 117	3 117	3 117	3 117	3 117	3 117
TOTAL	4 156	1 083	3 311	3 889	3 795	3 791	3 781	3 123	3 899	4 119	4 334	3 918	3 428	3 834	3 491
Net Cash Flow	15 635	15 708	16 480	15 902	15 996	16 000	16 010	16 668	15 892	15 672	15 447	15 873	16 363	15 957	16 300

Net present value at 10% discount rate : 7 144 without salvage, 3 705 with salvage
Net present value at 9% discount rate : 1 409 without salvage, 5 931 with salvage
Net present value at 8% discount rate : 11 887 without salvage, 17 849 with salvage

Internal rate of return : 9.16% without salvage, 9.60% with salvage

TABLE D.2

Goryooley Project Cash Flow - 20% Fall in Output

('000 So. Shs.)

Year:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
With Project															
Revenue	-	607	757	4 658	8 634	13 388	20 543	21 501	23 652	25 210	26 213	26 816	26 230	27 425	
Direct costs	-	644	600	2 924	4745	6 588	8 478	8 638	8 779	8 901	9 021	9 037	9 047	9 052	
Net revenue	-	(37)	157	1 734	3 889	6 800	12 065	12 863	14 873	16 309	17 192	17 779	17 183	18 383	
Without Project															
Revenue	202	247	1 308	2 503	3 907	5 349	5 647	5 647	5 647	5 647	5 647	5 647	5 647	5 647	
Direct costs	8	8	71	116	166	209	209	209	209	209	209	209	209	209	
Net revenue	194	239	1 237	2 387	3 741	5 140	5 438	5 438	5 438	5 438	5 438	5 438	5 438	5 438	
Net benefit	(194)	(276)	(1 080)	(653)	148	1 660	6 627	7 426	9 435	10 871	11 753	12 341	12 745	12 935	12 935
Project Costs															
Capital	18 231	26 962	(9 350)	16 720	12 045	7 376	344	6	937	562	729	968	6	2 065	782
Operation and maintenance	1 262	1 833	2 287	3 222	3 556	3 897	4 251	3 796	3 117	3 117	3 117	3 117	3 117	3 117	3 117
TOTAL costs	19 493	28 795	11 637	19 942	15 601	11 273	4 595	3 802	4 054	3 679	3 846	4 085	3 123	5 182	3 899
Net Cash Flow	(19 687)	(29 042)	(12 717)	(20 595)	(15 453)	(9 613)	2 032	3 624	5 381	7 192	7 908	8 256	9 622	7 753	9 036

TABLE D.3

Goryooley Project Cash Flow: Construction Costs Increased by 20% ('000 So. Shs.)

Year:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
With Project															
Revenue	-	759	946	5 822	10 792	16 735	25 679	26 877	29 565	31 513	32 766	33 520	34 038	34 281	
Direct costs	-	644	600	2 924	4745	6 588	8 470	8 638	8 779	8 901	9 021	9 037	9 047	9 052	
Net revenue	-	115	346	2 898	6 047	10 147	17 201	18 239	20 786	22 612	23 745	24 483	24 991	25 229	
Without Project															
Revenue	202	247	1 308	2 503	3 907	5 349	5 647	5 647	5 647	5 647	5 647	5 647	5 647	5 647	
Direct costs	8	8	71	116	166	209	209	209	209	209	209	209	209	209	
Net revenue	194	239	1 237	2 387	2 741	5 140	5 438	5 438	5 438	5 438	5 438	5 438	5 438	5 438	
Net benefit	(194)	(124)	(891)	511	2 306	5 007	11 763	12 801	15 348	17 174	18 307	19 045	19 553	19 791	19 791
Project Costs															
Capital	21 854	32 320	11 220	20 064	14 454	8 851	413	7	1 124	674	875	1 163	7	2 478	938
Operation and maintenance															
TOTAL costs	23 116	34 153	13 507	23 286	18 010	12 748	4 664	3 803	4 241	3 791	3 992	4 280	3 124	5 595	4 055
Net Cash Flow	(23 310)	(34 277)	(14 398)	(22 775)	(15 704)	(7 741)	7 099	8 998	11 197	13 383	14 315	14 765	16 429	14 196	15 736

TABLE D.3 (Cont.)

Year:	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
With Project															
Revenue															34 281
Direct Costs															9 052
Net Revenue															25 229
Without Project															
Revenue															5 647
Direct Costs															209
Net Revenue															5 438
Net Benefit															19 719
Project Costs															
Capital	1 247	1 159	233	926	815	809	797	7	2 478	1 202	1 472	961	373	860	449
O & M															
Total costs	4 364	4 276	3 350	4 043	3 932	3 926	3 914	3 124	5 595	4 319	4 589	4 078	3 490	3 977	3 566
Net Cash Flow	15 427	15 515	16 441	15 748	15 859	15 865	15 877	16 667	14 196	15 472	15 202	15 713	16 301	15 814	16 225

TABLE D.4

Goryooley Project Cash Flow - Up Valuation of Foreign Exchange Element by 50%

('000 So. Shs.)

Year:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
With Project															
Revenue	-	1 138	1 419	8 733	16 188	25 102	38 518	40 315	44 347	47 269	49 149	50 280	51 057	51 421	
Direct costs	-	818	762	3 713	6 026	8 367	10 767	10 970	11 149	11 304	11 457	11 477	11 490	11 496	
Net revenue	-	320	657	5 020	10 162	16 735	27 750	29 345	33 189	35 965	37 692	38 803	39 567	39 925	
Without Project															
Revenue	303	370	1 962	3 754	5 860	8 023	8 470								
Direct costs	10	10	87	142	203	255	255								
Net revenue	293	360	1 875	3 612	5 657	7 768	8 215								
Net benefit	(293)	(360)	(1 218)	1 408	4 505	8 967	19 535	21 130	24 983	27 750	29 477	30 588	31 352	31 710	
Project Costs															
Capital										815	1 057	1 404	9	2 994	1 134
O & M															
TOTAL costs	25 495	36 708	14 777	25 293	19 688	14 216	4 618	4 673	4 969	4 431	4 673	5 020	3 625	6 610	4 750
Net Cash Flow	(25 798)	(37 068)	(15 995)	(23 885)	(15 183)	(5 249)	14 917	16 457	20 014	23 319	24 804	25 568	27 727	25 100	26 960

TABLE D:4 (cont:)

Goryooley Project Cash Flow - Up Valuation of Foreign Exchange Element by 50%

('000 So. Shs.)

Year:	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
With Project															
Revenue															
Direct costs															
Net revenue															
Without Project															
Revenue															
Direct costs															
Net revenue															
Net benefit	31 710														
Project Costs															
Capital	1 507	1 401	281	1 119	985	977	963	9	2 994	1 453	1 779	1 161	451	1 040	542
Operation and maintenance	3 616														
TOTAL costs	5 123	5 017	3 897	4 735	4 601	4 593	4 579	3 625	6 610	5 069	5 395	4 777	4 067	4 656	4 158
Net Cash Flow	26 587	26 693	27 813	26 975	27 109	27 117	27 131	28 085	25 100	26 641	26 315	26 933	27 643	27 054	27 552

12% PV 1 377 3 379 with salvage IRR 12.2% or 12.4%
13% PV -7 543 - 6 009 with salvage

TABLE D.5

Goryooley Project Cash Flow: Foreign Exchange Flow

('000 So. Shs.)

Year:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
With Project															
Revenue	-	759	946	5 822	10 792	16 735	25 679	26 877	29 565	31 513	32 766	33 520	34 038	34 281	
Direct costs	-	348	324	1 579	2 562	3 558	4 578	4 665	4 741	4 807	4 871	4 880	4 885	4 888	4 888
Net revenue	-	411	622	4 230	8 230	13 177	21 101	22 212	24 824	16 706	27 895	28 640	29 153	29 393	
Without Project															
Revenue	202	247	1 308	2 503	3 907	5 349	5 647	547							547
Direct costs	2	2	16	26	37	46	46	46							46
Net revenue	200	245	1 292	2 477	3 870	5 303	5 601	5 601							5 601
Net benefit	(200)	166	(670)	1 766	4 360	7 874	15 000	16 611	19 223	21 105	22 294	23 039	23 552	23 792	23 792
Project Costs															
Capital															
Operation and maintenance															
TOTAL costs	2 003	15 825	6 281	10 702	8 174	5 887	2 047	1 742	1 830	1 493	1 643	1 858	992	2 846	1 691
Net foreign exchange flow	(12 203)	(15 659)	(6 951)	(8 936)	3 814	1 987	13 453	14 869	17 393	19 612	20 651	21 181	22 560	20 946	22 101

TABLE D.5 (cont.)

Year:	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
With Project															34 281
Revenue	34 281														4 888
Direct costs	4 888														29 393
Net revenue	29 393														
Without Project															5 641
Revenue	5 647														46
Direct costs	46														5 601
Net revenue	5 601														23 792
Net benefit	23 792														
Project Costs															
Capital															
Operation and maintenance															
TOTAL costs	1 922	1 856	1 162	1 682	1 579	1 594	1 585	992	2 846	1 889	2 091	1 708	1 267	1 632	1 324
Net foreign exchange flow	21 870	21 936	22 630	22 110	22 195	22 198	22 207	22 800	20 946	21 903	21 701	22 084	22 525	22 160	22 468
							10%PV	68 492							

TABLE D.6

Goryooley Project Cash Flow : Basic Assumptions

Asayle Option on Construction (includes allowance for benefit to Asayle)

('000 So. Shs.)

Year:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
With Project															
Revenue	-	759	946	5 822	10 792	16 735	25 679	26 877	29 565	31 513	32 766	33 520	34 038	34 281	
Direct costs	-	644	600	2 924	4 745	6 588	8 478	8 638	8 779	8 901	9 021	9 037	9 047	9 052	
Net revenue	-	115	346	2 898	6 047	10 147	17 201	18 239	20 786	22 612	23 745	24 483	24 991	25 229	
Without Project															
Revenue	202	247	1 308	2 503	3 907	5 349	5 647	5 647	5 647	5 647	5 647	5 647	5 647	5 647	
Direct costs	8	8	71	116	166	209	209	209	209	209	209	209	209	209	
Net revenue	194	239	1 237	2 387	3 741	5 140	5 438	5 438	5 438	5 438	5 438	5 438	5 438	5 438	
Net benefit	(194)	(124)	(891)	511	2 306	5 007	11 763	12 801	15 348	17 174	18 307	19 045	19 535	19 791	19 791
Project Costs															
Capital	18 505	29 284	10 290	17 955	12 810	7 676	344	6	663	382	729	969	6	7 516	422
Operation and maintenance	1 262	1 833	2 287	3 173	3 477	3 876	4 232	3 777	3 098	30 988	3 098	3 098	3 098	3 098	3 098
TOTAL costs	19 767	31 117	12 577	21 128	16 287	11 547	4 576	3 783	3 761	3 480	3 827	4 067	3 104	4 614	3 520
Net Cash Flow	(19 961)	(31 241)	(13 468)	(20 617)	(13 981)	(6 540)	7 187	9 018	11 587	13 694	14 480	14 978	16 449	15 177	16 271

TABLE D.6 (cont.)

Year:	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
With Project															
Revenue															
Direct costs															
Net revenue															25 229
Without Project															
Revenue															
Direct costs															
Net revenue															5 438
Net benefit	19 791														19 791
Project Costs															
Capital	1 614	996	194	498	499	674	664	6	1 516	642	1 802	801	311	443	194
Operation and maintenance	3 098	3 098	3 098	3 098	3 098	3 098	3 098	3 098	3 098	3 098	3 098	3 098	3 098	3 098	3 098
TOTAL costs	4 712	4 062	3 292	3 596	3 597	3 772	3 762	3 104	4 614	3 740	4 900	3 899	3 409	3 541	3 292
+ salvage															+60 000
Net Cash Flow	15 079	15 729	16 499	16 195	16 194	16 019	16 029	16 607	15 177	16 051	14 891	15 892	16 382	16 251	16 499
															76 499

10% PV - 10 942 -7 503 Zero at 8.70 without
9% PV - 2 449 2 072 9.20 with salvage

TABLE D.7

Goryooley Project Farm Financial Cash Flow Showing Charges and Project Revenue

('000 So. Shs.)

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Net crop revenue (farm level)	-	241	248	1 487	4 307	5 682	8 868	11 242	13 151	14 459	15 537	16 136	16 566	16 780	16 780
Net revenue (for farm disposal)	-	8	8	297	569	806	1 064	1 064							1 064
Farm cash flow	-	233	240	1 190	3 738	4 876	7 804	10 178	12 089	13 395	14 473	15 072	15 502	15 716	15 716
Project costs	19 493	28 795	11 637	19 942	15 601	11 273	4 595	3 802	4 054	3 879	3 846	4 085	3 123	5 186	3 899
Charges to HQ	-	-	-	-	615	1 661	3 190	4 784	6 613	7 371	8 260	8 888	9 316	9 508	9 508
Net cash flow to project HQ	(19 493)	(28 795)	(11 637)	(19 942)	(14 986)	(9 612)	(1 405)	982	2 109	3 692	1 414	4 803	6 193	4 322	5 601
Surplus for distribution to members	0	233	240	1 190	2 123	3 215	4 614	5 394	5 926	6 114	6 213	6 184	6 106	6 208	6 208
Income of members		233	240	1 693	3 152	4 879	6 968	8 054	8 787	9 106	9 205	9 176	9 178	9 191	9 191

TABLE D.7 (cont.)

Year:	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
Net Crop Revenue (farm level)	16 780														16 780
Net Revenue (for farm disposal)	10 640														10 640
Farm Cash Flow	15 716														15 716
Project Costs	4 156	4 083	3 311	3 999	3 795	3 791	3 781	3 123	3 899	4 119	4 344	3 918	3 428	3 834	3 491
Charges to HQ	9 508														
Net cash flow to Project HQ	5 352	5 425	6 197	5 619	5 713	5 717	5 727	6 385	5 609	5 389	5 164	5 590	6 980	5 674	6 017
Surplus for distribution to members	6 208														6 208
Income of members	9 191														9 191

Internal Rate of Return 4%

TABLE D.8

Qoryooley Project Financial Cash Flow ('000 So. Shs.)

Year:	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
With Project															
Revenue	-	699	870	5 147	9 477	14 477	20 420	23 252	25 506	27 151	28 224	28 856	29 294	29 502	29 502
Direct costs	-	670	627	3 157	5 141	7 131	9 198	9 350	9 492	9 610	9 715	9 728	9 736	9 739	9 739
Net revenue	-	22	243	1 990	4 336	7 346	11 222	13 902	16 014	17 541	18 529	19 128	19 558	19 763	19 763
Without Project															
Revenue	146	191	961	1 930	3 029	4 164	4 462	4 462	4 462	4 462	4 462	4 462	4 462	4 462	4 462
Direct costs	10	10	94	154	220	277	277	277	277	277	277	277	277	277	277
Net revenue	137	181	867	1 776	2 809	3 887	4 185	4 185	4 185	4 185	4 185	4 185	4 185	4 185	4 185
Net benefit	(137)	(159)	(624)	214	1 527	3 459	7 037	9 717	11 829	13 356	14 344	14 943	15 373	15 578	15 578
Project Costs															
Capital	18 231	26 962	9 350	16 720	12 045	7 376	344	6	937	562	729	968	6	2 065	782
O & M	120	1 833	2 287	3 222	3 556	3 897	4 251	3 796	3 117	3 117	3 117	3 117	3 117	3 117	3 117
TOTAL costs	19 493	28 795	11 637	19 942	15 601	11 273	4 595	3 802	4 054	3 679	3 846	4 085	3 123	5 182	3 899
Net Cash Flow	(19 630)	(28 954)	(12 261)	(19 728)	(14 074)	(7 814)	2 442	5 915	7 775	9 677	10 498	10 858	12 250	10 396	11 679

Internal Rate of Return : 6.3% without salvage value or 6.95% with salvage value.

TABLE D.8 (cont.)

Year:	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
With Project															
Revenue															
Direct costs															
Net revenue															
Without Project															
Revenue															
Direct costs															
Net reveue															
Net benefit	15 578	15 578	15 578	15 578	15 578	15 578	15 578	15 578	15 578	15 578	15 578	15 578	15 578	15 578	15 578
Project Costs															
Capital	1 039	966	194	772	678	674	664	6	2 065	1 002	1 227	801	311	717	374
Operation and maintenance	3 117	3 117	3 117	3 117	3 117	3 117	3 117	3 117	3 117	3 117	3 117	3 117	3 117	3 117	3 117
TOTAL costs	4 156	4 083	3 311	3 889	3 795	2 791	2 781	3 128	3 899	4 119	4 334	3 918	3 428	3 834	3 491
Net cash flow	11 422	11 495	12 267	11 689	11 783	11 787	11 797	12 455	11 679	11 459	11 234	11 660	12 150	11 744	12 087

APPENDIX E

MASTER PLAN BUDGETS

TABLE E.1

Basic Farm Budget Economic Prices (So.Shs/ha)

	Price	Intensity	Yield (q)	Revenue	Costs	Gross margin
Rice	338	0.4	30	2 636	864	1 772
Cotton	320	0.35	25	2 800	673	2 127
Sesame	250	0.25	10	625	115	510
Maize	119	0.4	40	1 904	444	1 460
Livestock				7 965	2 096	5 869
				738	157	581
TOTAL				8 703	2 253	6 450

TABLE E.2

Asayle Large Farms - Budget (So.Shs./ha)

	Intensity	Yield (q)	Revenue	Costs	Net revenue	Labour	Total with labour
Maize	0.4	40	1 904	444	1 460	171	1 289
Rice	0.4	30(19.5)	2 636	864	1 772	110	1 662
Sesame	0.25	10	625	115	510	92	418
Cotton	0.15	25	1 200	288	912	128	784
Livestock			6 535	1 711	4 654	501	4 153
			738	157	581		
TOTAL			7 103	1 868	5 235		4 734

TABLE E.3

Asayle Co-operatives - Budget

	Intensity	Yield	Revenue	Costs	Net revenue
Maize	0.6	40	2 856	667	2 189
Sesame	0.5	10	1 250	230	1 020
Cotton	0.3	25	2 400	576	1 824
Livestock			6 506	1 473	5 033
			738	157	581
TOTAL			7 244	1 630	5 614

TABLE E.4

Mukoy Dumis - Budget

(So.Shs./ha)

	Intensity	Yield	Revenue	Costs	Net revenue
Maize	0.3	40	1 428	333	1 095
Sesame	0.3	10	750	138	612
Cotton	0.4	25	3 200	768	2 432
Livestock			5 378	1 239	4 139
			738	157	
TOTAL			6 116	1 396	4 720

TABLE E.5

Der Flood Project Budget at Maturity

(So.Shs./ha)

	Intensity	Yield	Revenue	Direct costs	Net revenue
Maize	0.4	30	1 428	512	916
Sesame	0.6	10	1 500	180	1 320
Cotton	0.2	18	1 152	256	896
Livestock			4 080	948	3 132
			738	157	581
TOTAL			4 818	1 105	3 713

TABLE E.6

Development Zone - Farm Budgets, So.Shs. (economic prices)

		Intensity	Yield (q)	Revenue	Direct costs	Gross margin
1.	Main development zones					
	Maize	0.5	25	1 488	640	848
	Sesame	0.3	8	600	90	510
	Rice	0.4	20	1 758	560	1 198
	Livestock			5 846	1 290	2 556
				738	157	581
	TOTAL			4 584	1 447	3 137
2.	Majabto and Primo Secondario banana					
	Maize	0.6	25	1 785	432	1 353
	Sesame	0.5	8	1 000	150	850
	Cotton	0.30	15	1 440	384	1 056
	Livestock			4 225	966	3 259
				738	157	581
	TOTAL			4 963	1 123	3 840
3.	Waagade					
	Maize	0.7	25	2 083	504	1 570
	Sesame	0.5	8	1 000	150	850
	Livestock			3 083	654	2 429
				738	157	581
	TOTAL			3 821	811	3 010

TABLE E.7

Banana Crop Budget at Maturity

		Yield (q/ha)	Price (So. Shs./q)		Total (So. Shs.)
Returns:	Export	200	71	14 200	
	Home	50 (at 50%)	20	500	14 700
Costs:	Mechanisation			1 125	
	Chemicals including application			1 995	
	Fertiliser			1 220	
	Labour			2 060	6 400
Gross margin/ha per year					8 300

APPENDIX F

MASTER PLAN CASH FLOWS

TABLE F.1

Asayle Cash Flows ('000 So. Shs.)

Year	1	2	3	4	5	6	7	8	9	10	11 to 30
Gross margin	-	510	1 530	3 206	4 299	5 319	6 120	6 557	6 922	7 140	7 286
Gross margin without project	547	1 505	2 736	2 736	2 736	2 736	2 736	2 736	2 736	2 736	2 736
Net incremental benefit	(547)	(995)	(1 206)	470	1 563	2 583	3 384	3 821	4 186	4 404	4 550
Capital costs	17 820	5 940	5 940	-	-	-	-	-	-	-	-
Operation and maintenance	500	1 016	1 016	1 016	-	-	-	-	-	-	-
TOTAL costs	18 320	6 956	6 956	1 016	1 016	1 016	1 016	1 016	1 016	1 016	1 016
Net cash flow	(18 867)	(7 951)	(8 162)	(546)	547	1 567	2 368	2 805	3 170	3 388	3 534

TABLE F.2

Der Flood Cash Flows ('000 So. Shs)

Year	1	2	3	4	5	6	7	8	9	10	11 to 30
Gross margin	-	249	748	1 568	2 103	2 317	2 994	3 208	3 386	3 493	3 564
Gross margin without project	175	482	877	877	877	877	877	877	877	877	877
Net incremental benefit	(175)	(233)	(129)	691	1 226	1 440	2 117	2 331	2 509	2 616	2 867
Capital costs	6 590	2 197	2 197	-	-	-	-	-	-	-	-
Operation and maintenance	100	238	238	-	-	-	-	-	-	-	-
TOTAL costs	6 690	2 435	2 435	238	238	238	238	238	238	238	238
Net cash flow	(6 865)	(2 668)	(2 564)	453	988	1 202	1 879	2 093	2 271	2 378	2 449

TABLE F.3

Mukoy Dumis Cash Flows ('000 So. Shs.)

Year	1	2	3	4	5	6	7	8	9	10	11	12 to 30
Gross margin	-	389	1 168	2.414	4.050	5 062	6 075	6 853	7 243	7 554	7 710	7 788
Gross margin without project	116	310	543	775	775	775	775	775	775	775	775	775
Net incremental benefit	(116)	79	625	1 639	3 275	4 287	5 300	6 078	6 468	6 779	6 935	7 013
Capital costs	20 839	8 335	8 335	4 168	-	-	-	-	-	-	-	-
Operation and maintenance	500	1 000	1 397	1 397	-	-	-	-	-	-	-	-
TOTAL costs	21 339	9 335	9 732	5 565	1 397	1 397	1 397	1 397	1 397	1 397	1 397	1 397
Net cash flow	(21 455)	(9 256)	(9 107)	(3 926)	1 878	2 890	3 903	4 681	5 071	5 382	5 538	5 616

TABLE F.4

Golweyn Cash Flows ('000 So. Shs.)

Year	1	2	3	4	5	6	7	8	9	10	11	12 to 30
Gross margin	-	569	1 708	3 529	5 920	7 400	8 880	10 018	10 587	11 042	11 270	11 384
Gross margin without project	257	685	1 199	1 713	1 713	1 713	1 713	1 713	1 713	1 713	1 713	1 713
Net incremental benefit	(257)	(116)	509	1 816	4 207	5 687	7 167	8 305	8 874	9 329	9 557	9 671
Capital costs	17 470	6 988	6 988	3 490	-	-	-	-	-	-	-	-
Operation and maintenance	500	1 000	1 406	1 406	-	-	-	-	-	-	-	-
TOTAL costs	17 970	7 988	8 394	4 896	1 406	1 406	1 406	1 406	1 406	1 406	1 406	1 406
Net cash flow	(18 227)	(8 104)	(7 885)	(3 080)	2 801	4 281	5 761	6 899	7 468	7 923	8 151	8 265

TABLE F.5

Faraxaane Cash Flows ('000 So. Shs.)

Year	1	2	3	4	5	6	7	8	9	10	11	12	13-30
Gross margin	-	774	2 580	5 160	8 772	14 448	18 060	20 382	22 962	23 994	25 026	25 542	25 800
Gross margin without project	634	1 590	2 362	4 451	6 359	6 359	6 359	6 359	6 359	6 359	6 359	6 359	6 359
Net incremental benefit	(634)	(816)	(282)	709	2 413	8 089	11 701	14 023	16 603	17 635	18 667	19 183	19 441
Capital costs	42 597	18 932	14 199	9 466	9 466	-	-	-	-	-	-	-	-
Operation and maintenance	1 500	2 000	2 500	3 080	3 080	3 080	-	-	-	-	-	-	-
TOTAL costs	44 097	20 932	16 699	12 546	12 546	3 080	3 080	3 080	3 080	3 080	3 080	3 080	3 080
Net cash flow	(44 731)	(21 748)	(16 981)	(11 837)	(10 133)	5 009	8 621	10 943	13 523	14 555	15 587	16 103	16 361

TABLE F. 6

Shalambood Cash Flows ('000 So. Shs.)

Year	1	2	3	4	5	6	7	8	9	10	11	12	13-30
Gross margin	-	767	2 558	5 116	8 698	14 325	17 907	20 209	22 767	23 790	24 814	25 325	25 581
Gross margin without project	415	1 037	1 867	2 904	4 140	4 148	4 148	4 148	4 148	4 148	4 148	4 148	4 148
Net incremental benefit	(415)	(270)	691	2 212	4 550	10 177	13 759	16 061	18 691	19 642	20 666	21 177	21 433
Capital costs	41 592	18 485	13 864	9 243	9 243	-	-	-	-	-	-	-	-
Operation and maintenance	1 500	2 000	2 500	3 083	3 083	3 083	-	-	-	-	-	-	-
TOTAL costs	43 092	20 485	16 364	12 326	12 326	3 083	3 083	3 083	3 083	3 083	3 083	3 083	3 083
Net cash flow	(43 507)	(20 755)	(15 673)	(10 114)	(7 776)	7 094	10 676	12 978	15 536	16 559	17 583	18 094	18 350

TABLE F.7

Goryooley Cash Flows ('000 So. Shs.)

Year	1	2	3	4	5	6	7	8	9	10	11	12	13-30
Gross margin	-	774	2 580	5 160	8 772	14 448	18 060	20 382	22 962	23 994	25 026	25 542	25 800
Gross margin without project	544	1 360	2 447	3 807	5 438	5 438	5 438	5 438	5 438	5 438	5 438	5 438	5 438
Net incremental benefit	(544)	(586)	133	1 353	3 334	9 010	12 622	14 944	17 524	18 556	19 588	20 104	20 362
Capital costs	40 783	18 126	13 594	9 063	9 063	-	-	-	-	-	-	-	-
Operation and maintenance	1 500	2 000	2 500	2 974	2 974	2 974	-	-	-	-	-	-	-
TOTAL costs	42 283	20 026	16 094	12 037	12 037	2 974	2 974	2 974	2 974	2 974	2 974	2 974	2 974
Net cost flow	(42 827)	(20 712)	(15 961)	(10 684)	(8 703)	6 036	9 648	11 970	14 550	15 582	16 614	17 130	17 388

TABLE F.8

Faraxaane Enlarged Cash Flows ('000 So. Shs.)

Year	1	2	3	4	5	6	7	8	9	10	11	12	13-30
Gross margin (1)	-	186	619	1 238	2 105	3 468	4 334	4 892	5 511	5 759	6 006	6 130	6 192
Gross margin (1) without project	175	482	877	877	877	877	877	877	877	877	877	877	877
Net incremental benefit (1)	(175)	(296)	(258)	361	1 228	2 591	3 457	4 015	4 634	4 882	5 129	5 253	5 315
TOTAL capital costs (1)	10 583	5 024	4 008	3 011	3 011	739	739	739	739	739	739	739	739
Cash flow (1)	(10 758)	(5 320)	(4 266)	(2 650)	(1 783)	1 852	2 718	3 276	3 895	4 143	4 390	4 514	4 576
Faraxaane project costs (2)	(55 489)	(27 068)	(21 247)	(14 487)	(11 916)	6 861	11 339	14 219	17 418	18 698	19 977	20 617	20 937
Difference between cash flow	(3 839)	(2 652)	(1 702)	(3 103)	(2 771)	650	839	1 183	1 624	1765	1 941	2 065	2 127

Notes : (1) These figures relate to revised development for the der flood area only
(2) From Table F.5

TABLE F.9

Banana Drainage Project Cash Flows /100 ha ('000 So. Shs.)

Year	1	2	3	4	5	6	7	8	9	10	11 to 30
Gross margin	234	293	353	413	473	532	591	651	711	770	830
Gross margin without project	234	217	201	185	168	151	135	119	103	86	170
Incremental benefit	0	76	152	228	305	381	456	532	608	684	660
Cost in field work	1 734	-	-	-	-	-	-	-	-	-	-
Operation and maintenance	30	30	30	30	30	30	30	30	30	30	30
Net cash flow	(1 764)	46	122	198	275	351	426	502	578	654	630
Alternative											
No yield decrease	0	59	119	179	239	298	357	417	477	536	596
Net cash flow	(1 764)	29	89	149	209	268	327	387	447	506	566

JAMHUURIYADDA DIMOQRAADIGA SOMAALIYA
WASAARADDA BEERAHA
SOMALI DEMOCRATIC REPUBLIC
MINISTRY OF AGRICULTURE

GENALE-BULO MARERTA PROJECT

ANNEX IX
Management and Implementation

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JULY 1978

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PROJECT AREA AND STUDY AREA

This study contained two elements, a Master Plan covering 67 400 hectares and a feasibility study of 5 000 hectares.

Throughout the reports the term Study Area refers to the area covered by the Master Plan studies and the term Project Area is used for the feasibility study area.

ABBREVIATIONS USED IN THE REPORTS

ADB	African Development Bank
ADC	Agricultural Development Corporation
CARS	Central Agricultural Research Station - Afgooye
DAP	Diammonium phosphate
EDF	European Development Fund
ENB	National Banana Board
FAO	Food and Agriculture Organisation
FAO/PP	FAO Pilot Project (Afgooye - Mordiile Project)
HASA	Hides and Skins Agency
HTS	Hunting Technical Services Limited
HV	High volume (crop sprayer)
IBRD	International Bank for Reconstruction and Development (the World Bank)
ITCZ	Inter-tropical convergence zone
ITDG	Intermediate Technology Development Group (London)
JOSR	Jowhar Offstream Storage Reservoir
LDA	Livestock Development Agency
Libsoma	Libya-Somalia Agricultural Development Company
LSU	Livestock unit
LV	Low volume (crop sprayer)
MLFR	Ministry of Livestock, Forestry and Range
MMP	Sir M. MacDonald & Partners
NCA	Net cultivable area
NCB	National Commercial and Savings Bank (formerly National Commercial Bank)
ONAT	National Farm Machinery and Agricultural Supply Service
PLO	Palestine Liberation Organisation
SDB	Somali Development Bank
SNAI	Jowhar Sugar Estate
TDN	Total digestible nutrients
TDP	Total digestible protein
ULV	Ultra-low volume (crop sprayer)
UNDP	United Nations Development Programme
USBR	United States Bureau of Reclamation
USDA SCS	United States Department of Agriculture, Soil Conservation Service
WHO	World Health Organisation

SPELLINGS OF PLACE NAMES

Throughout the report Somali spellings have been used for place names with the exception of Mogadishu where the English spelling has been used. To avoid misunderstanding, we give below a selected list of Somali, English and Italian spellings where these differ.

Somali	English	Italian
Afgooye	Afgoi	Afgoi
Awdheegle	-	Audegle
Balcad	Balad	Balad
Baraawe	Brava	Brava
Buulo Mareerta	Bulo Marerta	Bulo Mererta
Falkeerow	-	Falcheiro
Gayweerow	-	Gaivero
Golweyn	-	Goluen
Hawaay	Avai	Avai
Hargeysa	Hargeisa	-
Janaale	Genale	Genale
Jelib	Gelib	Gelib
Jowhar	Johar	Giohar
Kismaayo	Kisimaio	Chisimaio
Marka	Merca	Merca
Muqdisho	Mogadishu	Mogadiscio
Qoryooley	-	Coriolei
Shabeelle	Shebelli	Scebeli
Shalambood	Shalambot	Scialambot

GLOSSARY OF SOMALI TERMS

Cambuulo	-	Traditional dish of chopped boiled maize with cowpeas or green grams.
Chiko	-	Chewing tobacco
Der	-	Rainy season from October to December
Dharab	-	Five jibals or approximately 0.31 ha
Gu	-	Rainy season in April and May
Hafir	-	Large reservoir on farms for storing water for use in dry periods
Hagai	-	Climatic season June to September characterised by light scattered showers
Jibal	-	Area of land approximately 25 m by 25 m or 0.0625 ha
Jilal	-	Dry season from January to April
Kawawa	-	Two man implement for forming irrigation ditches
Moos	-	Measurement of land area equal to a quarter of a jibal
Quintal	-	Unit of weight measurement equivalent to 100 kg
Uar	-	See hafir
Yambo	-	Small short-handled hoe
Zareebas	-	Thorn cattle pen

CHAPTER 1

EXISTING SITUATION

1.1 Introduction

The purpose of this annex is to review the existing management structure covering all aspects of irrigation in the Study Area and to study the need to improve this structure to meet the requirements of development. For most purposes agricultural management and engineering management can be considered separately but there are certain areas where they need to be integrated.

1.2 Proposed Developments

The location of the Study Area is shown in Figure 1.1 and Figure 1.2 shows the area divided into development projects and development zones. The development projects are areas selected for comprehensive development comprising engineering works and integrated agricultural development with a new management structure. The development zones are areas more suited to gradual development consisting of remodelling of minor canals and repairs to canal structures, improvement of extension services, and an increase in agricultural inputs.

1.3 Existing Structure - Agriculture

At present the responsibility for agricultural development in the Study Area lies almost entirely with the Ministry of Agriculture although projects such as the Crash Programmes are beyond the jurisdiction of the ministry. This situation is by no means common in Somalia since many disciplines which would normally be considered the responsibility of the Ministry of Agriculture have been delegated to other ministries or autonomous bodies. Examples of this are the sugar industry, the cotton industry and livestock. A summary of Government bodies interested in agriculture is given in Table 1.1. It should be noted that, in general, Government agencies, not departments, develop projects. Within the Study Area all responsibility for agricultural services rest with the Regional Co-ordinator for Agriculture whose office is at Janaale. The engineering staff is dealt with separately in the next section but Table 1.2 shows the present agricultural service staff in the Lower Shabeelle region and Marka and Qoryooley districts. More details of the organisation are given in Annex IV.

1.4 Existing Structure - Engineering Aspects

Responsibility for allocation of river water, control of barrages, river gauging and flood control lies with the Director of Land and Water in the Ministry of Agriculture. This department has to look after the whole of Somalia although the majority of its work lies in the Shabeelle and Juba flood plains.

Most of the engineering work of the department's staff is related to flood protection works, although the department is also responsible for the construction of Jowhar offstream storage reservoir. At present a comprehensive land registration programme is being undertaken in the Lower Shabeelle region.

The department's staff are also responsible for the operation and maintenance of the barrages and main canals in the Study Area, under the direction of the Regional Controller for Agriculture. The staffing of the irrigation section is shown in Table 1.3.

TABLE 1.1

Major Government Bodies Concerned with Agriculture and Livestock

Ministry or Government department	Directorate (D) or Agency (A)	
Agriculture	Extension	(D)
	Research	(D)
	Co-operatives	(D)
	Crop protection	(D)
	Irrigation and land	(D)
	Planning	(D)
	(ENB)	(A)
	ONAT	(A)
Commerce	Agricultural Development Corporation	(A)
	Ente Nazional di Commercio	(A)
	Hides and Skins Agency	(A)
	Livestock Development Agency	(A)
Livestock, forestry and range	Animal production	(D)
	Animal health	(D)
	Forestry, range and wildlife	(D)
	Planning, research and training	(D)
Industry	Leather industry	-
	Skin processing	-
	Kismaayo meat processing factory	-
	Dairy	-
	Jowhar sugar estate (SNAI)	(A)
	Balcad cotton factory (Somaltex)	(A)
Mines	Water Development Agency	(A)
President's office	Crash Programmes	-
	Settlement Development Agency	(A)
	State Planning Commission	-
	Libsoma	(A)
Finance	Somali Development Bank	-

Note: Since this report was drafted the Agricultural Development Corporation has been transferred to the Ministry of Agriculture.

LOCATION OF THE STUDY AREA

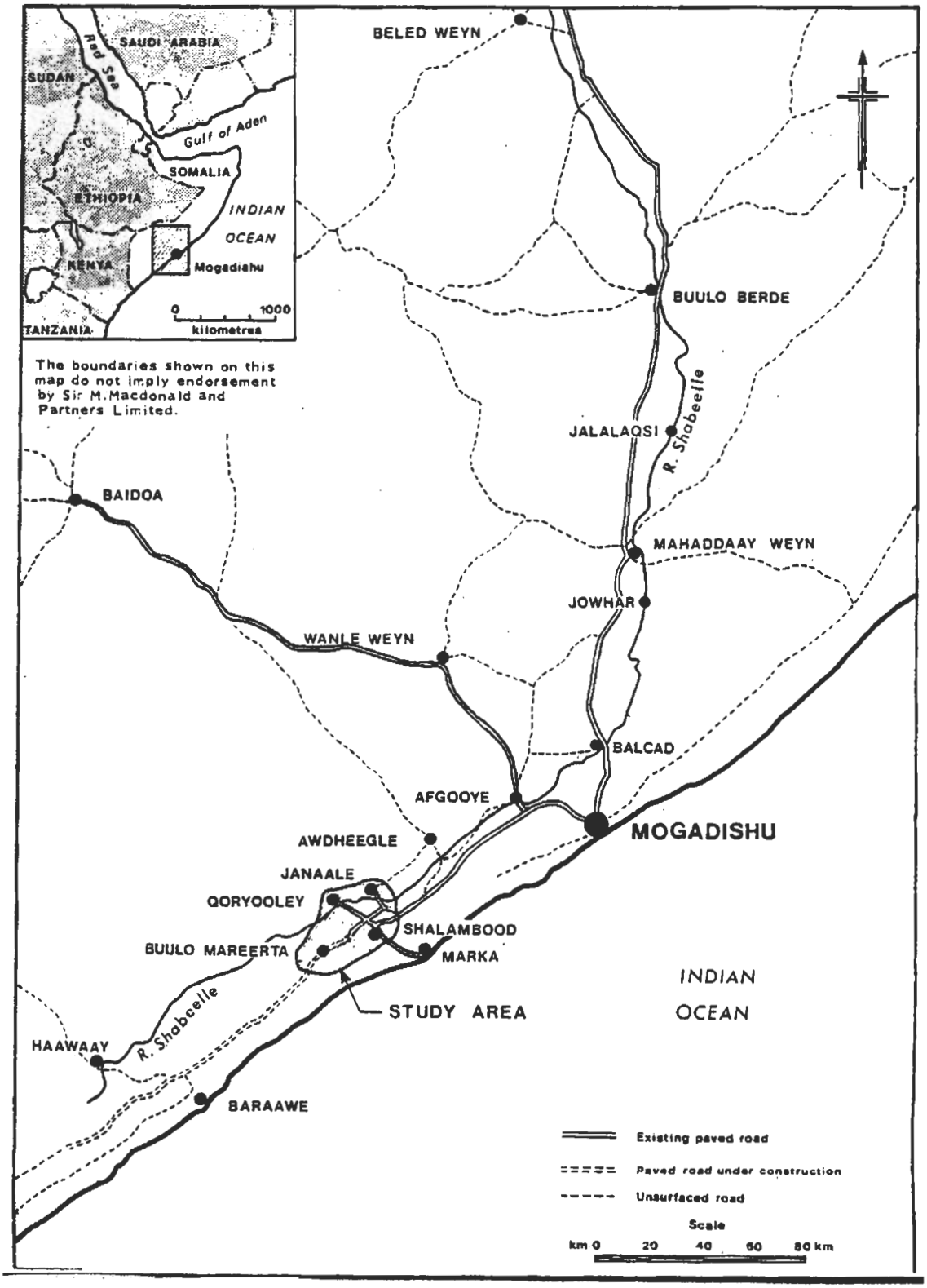

TABLE 1.2

Ministry of Agriculture Regional and District Technical Staff

Department	Regional Staff		District Staff	
	Officers	Technical assistants	Marka[1]	Qoryooley
Regional co-ordinator	1	-	-	-
District co-ordinator	-	-	Nil	1
Production extension and training	1	3	Nil	2
Co-operatives	1	2	Nil	5
Plant protection	1	4	1	1
Land and water[3]	1	16	Nil	1[2]

Notes: (1) Due to the shortage of qualified staff, work in Marka district is generally undertaken by regional staff.
(2) Undertaken by the district co-ordinator.
(3) Land and water staff cover the engineering functions.

Source: Regional Agricultural Co-ordinator, Janaale.

TABLE 1.3

Irrigation Staff

Regional office at Janaale	Number
Regional head of irrigation	1
Assistant head of irrigation	1
Head of land registration	1
Head of canals and equipment	1
Head of hydrology	1*
Canal guards and barrage operators	18
Excavator drivers	8
Bulldozer drivers	6
Mechanics	2
Vehicle drivers	2
Total	41
District office at Qoryooley	
District agricultural officer	1
Canal guards and barrage operators	3
Total	4
GRAND TOTAL	45

Note: * Not present at time of the study

CHAPTER 2

MANAGEMENT REQUIREMENTS

2.1 General Requirements

The structure of the Ministry of Agriculture covers all aspects but there is a shortage of trained and experienced staff which leads to unfilled vacancies in some departments and posts being filled by unsuitable staff in some cases. The Ministry of Agriculture is not accustomed to development projects and in the past much of this work has been delegated to specially appointed agencies. With the implementation of projects the system needs to be reviewed.

The first requirement is the establishment of the Shabeelle River Authority to operate Jowhar offstream storage reservoir and control development in the river basin. This is primarily an engineering function but there are important agricultural decisions to be made. The Authority is described in detail in Annex II, Chapter 16 and Chapter 3 below.

The second requirement is for the management of development projects. The implementation of projects will require radical changes in agricultural techniques and a full understanding of basic irrigation techniques. The management structure of the Qoryooley project is described in Chapter 4 and it is envisaged that most of the other projects will have a similar form of management which will integrate both agricultural and engineering aspects.

As described so far, the limits of each authority are not very definite and there is a considerable gap between the two. If the Shabeelle River Authority is responsible for the distribution of water in the flood plain and the project authorities are established to implement and manage particular projects, there is still the need to determine the priority for project development and to control the project authorities. There are three ways of doing this, viz :

(a) delegate authority to the Shabeelle River Authority

(b) establish a second new authority to be called a development authority, to oversee development of the Study Area

(c) leave the arrangement as it is at present under the direction of the Ministry of Agriculture.

Alternative (a), the delegation of responsibility for promotion of development to the Shabeelle River Authority is not recommended since the Authority will be new and will require many years to establish itself fully. This possibility may be considered eventually.

In considering alternative (b), the first problem is the definition of the boundaries of the new authority. Whilst the Study Area is a cohesive unit it would not seem desirable to promote other developments just outside the area by a different authority. Logically, the area covered by a development authority would be all the area which may possibly be irrigated. This in turn is similar to the area covered by the river authority. However, there is another

possibility. The office of the Regional Co-ordinator for Agriculture could be upgraded and made responsible for development projects. In fact there is very little difference between the area under controlled irrigation on the Lower Shabeelle Flood Plain and the area covered by the irrigation in Lower Shabeelle region. Balcad and Jowhar are both outside the region but apart from a small extent of smallholder irrigation, the only irrigation schemes there are the responsibility of the Ministry of Industry (at Balcad cotton and Jowhar sugar estates). There are therefore two possibilities to be considered for the implementation of the development projects, the strengthening of the regional co-ordinator's office, or the present situation, whereby control is centralised in the Ministry of Agriculture offices in Mogadishu. The regional office needs to be upgraded in any case so that it may organise the improvements in the development zones but it is considered unwise to expect the regional office to undertake major development works in the next few years. This means that the choice of projects to be developed, and the establishment of project authorities, should be left with the Ministry of Agriculture central office even though the project authorities should be autonomous agencies reporting to the Secretary of State for Agriculture.

2.2 Division of Responsibility

The recommended management structure may be summarised as follows :-

(a) the Shabeelle River Authority will be responsible for deciding the allocation of water to projects

(b) the Ministry of Agriculture will determine the priority for project development and establish project authorities

(c) the project authorities will implement and manage the projects as autonomous agencies.

However this summary does not give the complete picture since many aspects have been omitted for the sake of clarity. In the case of water supplies, for example, it is envisaged that eventually the project authorities will deal directly with the river authority and will not go through the ministry but broad descriptions of the main functions are given in the succeeding chapters.

CHAPTER 3

THE SHABEELLE RIVER AUTHORITY

3.1 Functions of the Authority

The functions of the Authority are described in detail in Annex VII, Chapter 16 and summarised below:

(a) Flood control

(b) River gauging

(c) Monitoring groundwater levels and quality

(d) Registration of present users of river water and groundwater

(e) Development planning for the river basin

(f) Licensing of abstraction of river water and groundwater for both present users and future users

(g) Operation of Jowhar offstream storage reservoir

(h) Enforcement of controls on abstraction

(i) Maintenance of barrages and main canals

(j) Control of water-borne diseases

(k) Development of fisheries.

The Authority should be established as soon as possible so that staff can be trained by the Consultants during the commissioning of the reservoir which is expected in 1978 or 1979. (Note: Since this report was drafted the Ministry of Agriculture has proposed the establishment of a Shabeelle Water Authority within the ministry but governed by an inter-ministerial committee.)

3.2 Management Requirements

The major function of the Authority is the operation of Jowhar offstream storage reservoir and the major decisions will be the timing of periods when water is impounded or released. This will require knowledge of the irrigation demand downstream and many of the functions mentioned in the previous section are directed towards collection of the information necessary to assess demand.

At present most smallholders use irrigation to supplement rainfall. Insufficient irrigations are applied with the result that crops do not receive sufficient moisture and yields are reduced. Crop planting dates vary to fit in with rainfall or periods of high riverflow. The commissioning of Jowhar offstream storage reservoir will permit these practices to be changed and there should be

a slight improvement in yields without a major education programme but, to produce the maximum possible yields, planting dates in the river basin will have to be co-ordinated so that the best possible use of the available water can be made. The der crop planting dates should be brought forward to take advantage of the surplus der river water and save the impounded water for use when there is no alternative. For the der planting date to be brought forward it is necessary for gu crops to be cleared away and this in turn requires co-ordination of the planting of gu crops. This co-ordination of the planting dates will require extensive promotion involving not only the farmers themselves but also agricultural supply services, particularly ONAT, who will have to ensure that seed supplies are available on time.

At the end of the der season, only the perennial crops should be irrigated and water should not be given to late der crops. If proper planning and consultation has been done this should provide no problem but inevitably there will be some farmers who will require water. This will have to be left to the discretion of the Authority. It can be seen that the planning of releases will require considerable discussions with all bodies concerned with irrigation in the flood plain. The greatest changes in agricultural practices will be required in the der season but fortunately there should be sufficient water to satisfy all requirements at a high level of reliability if only minor modifications are carried out. The simulation studies also show that at the present level of development there should be sufficient water for the perennial crops in the dry season in nine years out of ten. Thus there should be considerable benefits from the reservoir in the first years of operation.

The reservoir is not suitable for storing water from one season for use in the following season because of evaporation and seepage losses, and the gu season flood is not always adequate to permit the reservoir to be filled with sufficient water to meet demands in June and July. This must be carefully explained to users so that they are aware of this limitation in advance and are not disappointed if there is a shortage of water in this period, as this will lead to their confidence in the Authority being lost and it will be difficult to enforce the controls required. There will always be conflicting demands for water and the Authority must balance these demands in consideration of the overall interests of the nation.

Another major function of the Authority will be the planning of development in the Shabeelle Flood Plain. Water is in great demand for irrigation and must be used as carefully as possible since it is probably the limiting resource. Therefore all proposed developments should be carefully scrutinised to ensure that only those that use water to its maximum potential are permitted. This will require liaison with all bodies concerned with development planning and an awareness of the everchanging state of world markets and their effects on Somali agriculture.

3.3 Structure of the Authority

In view of the need for the Authority to take the widest possible view of irrigation and agricultural development, it is proposed that it is established as an autonomous institution under the Secretary of State for Agriculture with a general manager who should be advised by a steering committee with representatives of the following organisations:-

Ministry of Agriculture
Ministry of Industry
Ministry of Finance
Settlement Development Agency
Water Development Agency
National Banana Board
Middle Shabeelle Regional Governor's office
Lower Shabeelle Regional Governor's office

The general manager's task will not be easy since he will constantly have to balance conflicting requirements, so the person appointed should have proved his ability as a manager and be able to persuade people to accept decisions which are in the national interest but not necessarily in accordance with individual needs.

If it is decided to establish the Authority under the Director of Land and Water in the Ministry of Agriculture, this Directorate must be greatly strengthened and expanded.

CHAPTER 4

QORYOOLEY PROJECT MANAGEMENT STRUCTURE

4.1 Introduction

The Qoryooley project will be set up within the framework of the co-operative principles of the Somali Government as set out in the Co-operatives Handbook issued in 1977. It is anticipated that the project will be a group of co-operatives, the headquarters being purely an administrative and service centre for the co-operatives which will be at village level. By having each village as a complete co-operative unit, full identification with their own working unit should be achieved. Administratively, problems should be minimised with the responsibility for village affairs and agricultural production being at the village level with a more ready acceptance of the authority of those elected to various functions. However, because of possible problems on the production side, each field unit within the village will be self-contained with respect to production, there being between 10 to 28 units in each village.

4.2 Field Units

The field unit, the smallest unit within the co-operative, will be the production unit. Each field will have an area of between 20 to 30 ha dependent on layout of irrigation distributries so that the field is totally independent with respect to water supply. Families will be allocated at the rate of 1.875 ha per household (in fact 2 ha but 0.125 ha will be located in a separate field with the rest of the village, for household plots for growing vegetables, etc.) so that there will be about 10 to 15 household-families per field. Full discussion of the hectarage per family and working people per family can be found in Annex VI, Chapter 3. The members of the field unit will be responsible for collectively working the area and will elect a small committe to expedite this work, one member of which will be the field supervisor who will receive some training at the pilot farm and will then be responsible for liaising with the village co-operative unit and passing on advice concerning dates for operations, technical advice such as seed and fertiliser rates, and relaying problems back to the village level. There will always be technically qualified people at the project headquarters who will be responsible for dealing with problems and general explaining of crop husbandry.

Family budgets have been based on a total holding of 2 ha per family and this shows that at maturity the family income will be greater than the present income from a 6 ha holding. Livestock will remain in private ownership and the present uneven distribution of livestock will not be changed for some time. This will be to the advantage of those who own most land at present. Only two farmers in the area own more than 6 ha.

The cropping pattern, irrigation, fertiliser and seed rates will all be decided and recommended from project headquarters - the field supervisor being responsible for ensuring that the field unit is aware of them. Machinery requirements for land preparation, combining (rice) and carting will be organised at village level, as will storage of inputs and crops. The field supervisor will ensure that the necessary requests are placed. Organisation of other work within the field will rest entirely with the field committee.

The field supervisor will not be salaried but will share fully in the benefits at the field level along with all the other co-operative members.

4.3 Village Organisation

The village can be considered as the main co-operative unit being responsible for the majority of the inputs to the farming, including management and advice, the collection and storage of the harvest and management of the machinery. The village will also represent the central unit for the field units where several problems can be discussed and ideas exchanged.

Each village will elect its own committee in a similar fashion to the present practice and this will be responsible for normal village affairs. Within this committee or parallel to it, the co-operative committee will be formed. However, the manager of the farm will be salaried and appointed by the project headquarters from where he will have received his training (one year on the pilot farm). It is desirable that the farm manager be elected by the co-operative members, provided that candidates are available with suitable qualifications or experience, but candidates must be approved by headquarters' staff who will have the right to select their own manager if a suitable candidate is not available; the experience of local conditions can always be extended by training. Although advice will always be available from project headquarters and the pilot farm, the manager will be responsible for the overall running of the village farm. This involves ensuring inputs are available and allocated as required, that the machinery is kept running in good order and that problems of allocation are solved (there will be a mechanic and drivers for the tractors and combine). Collection and storage of harvest is the manager's responsibility, and liaising with the Agricultural Development Corporation as necessary for purchasing the harvest. All the farm records must be kept at the village level with performances by field so that the related payments can be made.

The size of the villages varies considerably because of harmonising villages with distributary canals to avoid divided responsibility. The villages range from 200 ha to 600 ha with between 10 to 28 field units per village. The manager has a staff of two assistants, one or two irrigation staff, a mechanic, tractor drivers and administration staff. The assistants to the farm managers will have a certain number of field units each and will be responsible for liaising between field supervisors and the farm manager.

The farm will be considered as the accounting unit, including all farm staff, machinery costs, etc., within this unit, and the pilot farm, project headquarters and irrigation expenses will be considered as overheads.

4.4 Function of Headquarters

The functions of the headquarters organisation are outlined below.

4.4.1 Implementation

Implementation is dealt with fully in Chapter 8 of the Feasibility Study Main Report, and it is sufficient to say that design and supervision of the engineering works should be awarded to civil engineering consultants who

specialise in this work. However the project authority must supervise the whole project and will be the body making payments to the contractor. There will also be other activities which cannot be handled by consulting engineers including questions of land tenure, relocating farmers, and dealing with farmers whose irrigation supplies have been disrupted by the works.

To ensure the success of the project there will have to be a comprehensive training programme for all staff down to field supervisor level. This is dealt with in Section 4.4.4 below but training is regarded as the most vital element in the implementation programme and to ensure that it is successful the rate of implementation has been slowed down to fit in with the training programme. This should ensure that when areas are commissioned, farmers will understand and apply the new agricultural techniques immediately.

4.4.2 Management and Operation

The obvious requirement for operation and maintenance arises in the case of the canal and drainage system where there is a need for control of water supplies and maintenance of the engineering works. There is also a more important need in the organisation of agricultural inputs and marketing and in extension work. The organisation of inputs including the supply of spare parts for machinery will be most important and will depend on good liaison with other Government departments. Finally the project staff will be responsible for enforcing discipline on the farms and this will include applying sanctions to unsatisfactory farmers or even evicting them.

4.4.3 Research and Development

The term research and development could be misleading with respect to the work of the pilot farm although it is an apt description of the role of the farm. The research envisaged is not pure scientific research but applied research with the sole purpose of promoting the development of the Qoryooley project. At the moment very little is known about the soil-water relationships of the Project Area and this, especially the movement of water within the soils, is fundamental to the development of irrigation. Apart from this a great deal of development of crop varieties and cultivation techniques still remains to be done. The research role of the pilot farm may be summarised as follows:-

(a) selection of varieties (in conjunction with CARS)

(b) optimisation of planting dates (in conjunction with CARS)

(c) seed multiplication (in conjunction with CARS)

(d) development of fertiliser and pest control techniques

(e) development of cultivation techniques especially those related to irrigation practices

(f) experiments with hand tools and animal-drawn equipment

(g) understanding of soil-water physics with special reference to salinity problems

(h) development of irrigation techniques.

The pilot farm is also to be used for training.

4.4.4 Training

The need for training is manifest and the extent of the training required is so great that it is only possible to mention the salient features here. The training requirement for field supervisors may be summarised as follows:-

(a) application of correct cultivation techniques

(b) demonstration of advantages of using correct varieties

(c) demonstration of advantages of optimum planting dates

(d) use of siphons for irrigation

(e) estimating optimum irrigation application and frequency.

The project authority has to be built up from nothing and it is unlikely that experienced staff will be found. The farm managers are likely to be graduates of Mogadishu University and will need training in the practical side of farm management. There will also be training required for the assistant management, storekeepers, mechanics and even tractor drivers.

There are between 10 and 28 field units in each village and each unit will have a field supervisor who will require training. The minimum training period will be one year so that the supervisors can be taken through the full cropping calendar.

Obviously the need for training will be greatest during the implementation of the project but the size of the project is such that, even after the initial stages, there is likely to be a high turnover of staff due to natural wastage and also due to the fact that well-trained staff will be in demand throughout Somalia. This will be a constant problem for the project management but the loss of well-trained staff to the project should not necesarily be a loss to the country as a whole. As a result of this, some form of training will be required continuously throughout the life of the project.

It is understood that the National Extension Service and Farm Management Training Project is shortly to be established. This is likely to consist of a 400 ha pilot farm at Janaale and a 60 ha practical training farm for managerial techniques attached to the training centre at Afgooye. The farmer training centre at Janaale is being revived and this could be used to train field supervisors and lower grades of staff such as tractor drivers.

If the training function is removed from the pilot farm and the research into irrigation techniques is carried out elsewhere, the only role remaining for the pilot farm would be seed multiplication, which could be carried out on selected

areas within the Project Area. It must be stressed that the activities assigned to the pilot farm are essential to the success of the project and only if all are catered for elsewhere could the pilot farm as such be omitted from the project.

4.5 Need for Expatriate Staff

There is a severe shortage of experienced staff in Somalia; this is well known and has been reported elswehere.

'A serious employment problem facing the country is the shortage of skilled manpower in crucial operations. Almost everywhere, and in every project there is a cry for more skilled manpower and the low performance, or lack of implementation is invariably ascribed to shortage of professionals or technicians' (International Labour Organisation, 1977, Economic transformation in a socialist framework).

This situation is unlikely to change in the near future and as a result of this there is a two-fold need, first to recruit the staff capable of implementing the project and second to train the staff who are to manage the project. The only solution to this is the employment of expatriate staff and a total number of seven has been included for periods of between three and eight years. The length of the required period of service is so long that it is recommended that the expatriates are not recruited on an ad hoc basis since there are likely to be long periods between the termination of one contract of service and the commencement of the replacement and such lack of continuity destroys much of the good work which has been done. Furthermore the recruitment of individuals, however good, does not necessarily lead to good teamwork and the divisions of responsibility are difficult to define in such an integrated development.

Therefore it is recommended that the supervision and provision of management staff should be awarded to a company with the experience in agricultural development which will take responsibility for the staff and guarantee continuity.

4.6 Management Structure

The functions of the project management have been outlined above and it is obvious that the management will need to be decisive and responsive to change. It is considered that the most effective system of management would be as a Government agency with the general manager reporting directly to the Secretary of State for Agriculture.

The organisation structure of the project staff is shown in Figure 4.1 which shows the farms as distinct units and the experts as advisers with no direct responsibility for the running of the farms. The only official link between the farms and the experts should be through the asssistant manager but communications between the advisers and the farms should be encouraged along the lines shown.

4.7 Staff Requirements

The numbers of staff involved, their salaries, starting dates, and in the case of expatriate staff, the completion date, are all shown in Figures 4.2, 4.3 and 4.4. Table 4.1 shows the minimum qualifications for key staff. The figures and tables are self-explanatory but two points are worth elaborating on and these are the role of the general manager and the role of the commercial manager.

4.7.1 Duties of the General Manager

As head of a Government agency the general manager will have to report to the Minister for Agriculture. Among his general responsibilities will be the following:-

(a) ensuring that the project authority complies with Somali law

(b) appointment of senior staff

(c) appointment of consultants for supervision of development

(d) determination of policy and planning objectives

(e) monitoring of the project plan and programme

(f) preparation of annual reports

(g) preparation of annual budget and financial reports

(h) taking disciplinary action against negligent project staff

(i) warning or evicting unsatisfactory farmers.

The latter will be a most difficult task but it is essential that all farmers strive for the maximum possible production.

The project authority needs an engineer on its staff to supervise the many small engineering problems which arise from time to time. In the early stages, apart from the mechanical and electrical engineer there is no other member of staff suitably trained to deal with such problems. The construction of the project will require supervision by consulting engineers and the general manager must be in a position to administer the development.

The general manager will be responsible for authorising payments to contractors and co-ordination with other Somali authorities, therefore he must be a Somali. During the early stages the volume of work will be so great that he will need a special assistant who should be titled project adviser and who should be the senior engineer of the consulting engineers appointed for the supervision of construction.

TABLE 4.1

Minimum Qualifications for Key Staff - Qoryooley Project

Position	Qualifications	Experience	Comments
General manager	-	Ten years of management experience in development	-
Assistant manager	B.Sc.	Ten years in developing countries	Expatriate
Project adviser	B.Sc.	Ten years including construction and irrigation development	Expatriate
Pilot farm manager	B.Sc. or Diploma	Several years in farm management	Expatriate. Experience essential due to being one of the first staff to start work
Livestock assistant	Diploma or B.Sc.	-	This position is suitable for a volunteer post
Poultry unit animal health assistant	Diploma or B.Sc.	-	Little experience required since direction will be given by the pilot farm manager
Agricultural training officer	Diploma or B.Sc.	From practical back-ground with teaching/ training experience	Expatriate
Assistant training officer	Diploma	Training experience of at least one year	-

TABLE 4.1 (cont.)

Position	Qualifications	Experience	Comments
Irrigation agronomist	B.Sc.	Three to five years experience in irrigated agriculture with some research experience	-
Assistant irrigation agronomist	B.Sc.	-	Training element in post
Mechanical and electrical engineer	B.Sc.	Five years including some management experience	-
Irrigation engineer	B.Sc.	-	To be trained by the consulting engineers in design office and construction works before commencing work
Farm managers	Diploma	One or two years in farm management	Previous experience need not be specific due to pilot farm training
Assistant farm managers	Diploma	Experience probably not essential due to training element at pilot farm	Includes pilot farm
Commercial manager		Fifteen years including some experience of purchasing	

STRUCTURE OF PROJECT AUTHORITY

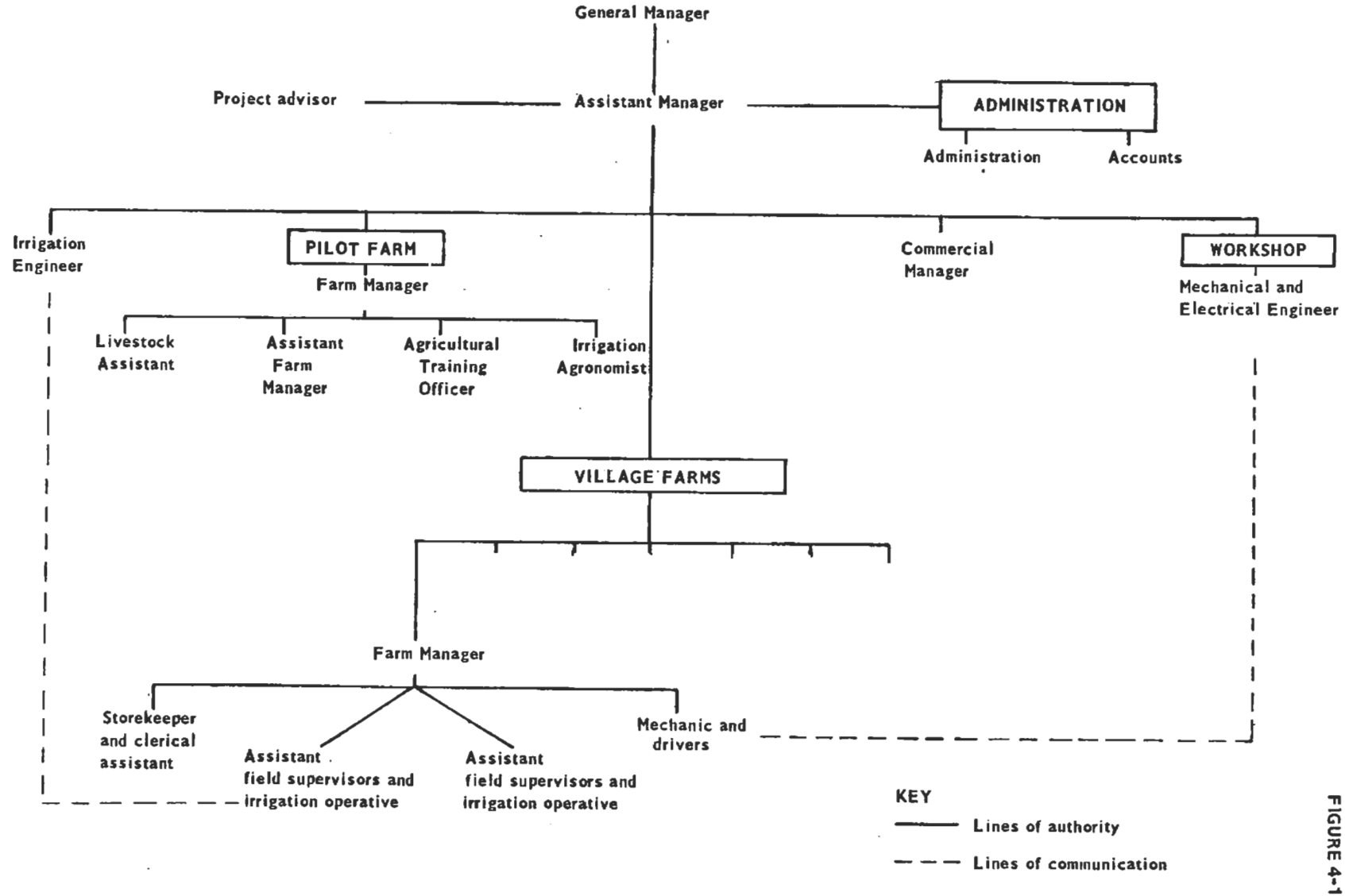

FIGURE 4-1

FIGURE 4-2

HEADQUARTERS MANAGEMENT STAFF AND PROGRAMME

JOB TITLE	No. of posts	ANNUAL cost 000's So Shs.	YEAR 1	2	3	4	5	6	7	8	9
General manager	1	30									
Assistant manager #	1	300									
Project advisor #	1	–									
Pilot farm manager #	1	250									
Assistant farm manager	1	25									
Technicians	1	8									
Livestock assistant #	1	120									
Poultry animal health assistant	1	12									
Livestock extension workers	3	10									
Poultry unit labourer	1	3.5									
Agricultural training officer #	1	200									
Assistant agricultural training officer	1	25									
Irrigation agronomist #	1	200									
Assistant irrigation agronomist	1	25									
Mechanical and electrical engineer #	1	200									
Assistant mechanical and electrical engineer	1	20									
Fitters	3	12									
Building foreman	1	15									
Carpenter	1	12									
Mason	1	12									
Electrician	1	12									
Commercial manager #	1	180									
Assistant commercial manager	1	25									
Administrative officer	1	25									
Personnel manager	1	20									
Nurse	1	15									
Ordering clerk	1	12									
Accountant	1	25									
Accounts clerks	3	12									
Interpreter	1	12									
Storemen	4	8									
Clerk. typists	8	7									
Drivers	6	7									
Labourers and watchman	20	3.5									

Notes:- # Indicates expatriate post initially

– – Means that not full complement of staff required

Cost of project advisor is covered by consulting engineer's fees

FIGURE 4-3

IRRIGATION OPERATION AND MANAGEMENT STAFF AND PROGRAMME

JOB TITLE	No. OF POSTS	ANNUAL COST 000's So Shs.	YEAR 1	2	3	4	5	6	7	8	9
Irrigation engineer	1	24	●	●	●	●	●	●			
Record clerk	1	6		■	■	■	■	■	■	■	■
Inlet operators	4	4				■	■	■	■	■	■
Canal regulator operators	12	4				■	■	■	■	■	■
Canal tail observers	8	3				■	■	■	■	■	■
Canal pump operators	3	6			■	■	■	■	■	■	■
Drain pump operators	1	6				■	■	■	■	■	■
Driver	1	5		■	■	■	■	■	■	■	■
Nightwatchmen	1	3				■	■	■	■	■	■
Dragline operatives	2	12						■	■	■	■
Hydraulic excavator operatives	2	12						■	■	■	■

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Notes ● ● The irrigation engineer spends three years in training with the consulting engineers

■ ■ Indicates that full complement of staff is not required

FIGURE 4-4

FARM UNIT STAFF AND PROGRAMME

JOB TITLE	No. OF POSTS	ANNUAL COST 000's So Shs.	YEAR 1	2	3	4	5	6	7	8	9
Farm manager	8	15			■	■	■	■	■	■	■
Assistant farm manager	15	12			■	■	■	■	■	■	■
Mechanics	8	10			■	■	■	■	■	■	■
Storeman	8	8			■	■	■	■	■	■	■
Clerical assistants	8	7			■	■	■	■	■	■	■
Tractor drivers	90	8			■	■	■	■	■	■	■
Irrigation operatives	14	6				■	■	■	■	■	■

Note:- ■■■ Indicates that full complement of staff is not required

4.7.2 Duties of the Commercial Manager

In many large organisations it is customary to have a procurement department. Within the agricultural sector of Somalia, one great problem is that inputs often arrive too late or not at all. It is therefore proposed that a separate office is established to deal with purchasing of all requirements and this department should also be responsible for the marketing of the produce from the Project Area. This office which will be small, will be under the charge of the commercial manager.

In order not to diversify his efforts, the commercial manager's responsibilities should be kept to a minimum and as much routine work as possible dealt with by the administration section.

The main functions of the commercial manager may be defined as follows:-

(a) negotiation of contracts for purchase of agricultural inputs from within Somalia

(b) organisation of all imports for the project

(c) negotiation of contracts for marketing of project produce.

These aspects are dealt with below.

(a) Purchases within Somalia

Although Government organisations have been established for the purpose of supplying farmers' needs, these will require strengthening before development may take place. It will therefore be the responsibility of the commercial manager to negotiate with suppliers to ensure that inputs arrive on the project when and where they are needed.

In the early stages of any contract the manager must satisfy himself that the supplier is capable of meeting his commitment; this is best done by informal contact but at the same time checks must be quite thorough. It is worth considering that at maturity the total value of chemicals and fertilisers required for the Qoryooley project will be more than So.Shs. 4 million per year.

(b) Special Imports

It will often be necessary for goods to be imported especially for the project. These goods may well be items of capital equipment, spare parts or special seeds or chemicals for the pilot farm since, for the project to prosper, considerable changes in agricultural techniques are required. The existing state trading organisations generally insist on arranging special imports themselves. This tendency must be resisted since the procedures involved in obtaining the necessary number of responsive quotations are usually complicated because of the poor communications between Somalia and the rest of the world. The commercial manager must be empowered to arrange letters of credit, and supervise shipping and insurance, and these tasks will also entail

obtaining approval for spending foreign exchange. It is essential that responsibility for prompt delivery is clearly in the hands of one organisation. Government bodies often have difficulty in clearing goods from customs but it is recommended that this task is delegated to the administration section in order to relieve the commercial manager of routine work. By the time goods have been shipped the major sources of delay should have been overcome and the urgency of the requirement for the goods should be sufficient incentive to guarantee clearance.

The procedures for import are complex and it will take time and organisation to ensure that all requirements are complied with, in the right order.

Careful planning will be required to guarantee that all the relevant papers are handed over from the commercial manager to the administrative officer.

(c) Marketing of Produce

The marketing of produce should not be a burdensome task due to the competence of the Agricultural Development Corporation but even so there may be occasions when the standard buying terms are not appropriate for the large volumes the project will produce, therefore special terms must be negotiated.

The commercial manager will have a difficult role since he will be negotiating with outside bodies over which the project has no control. On the other hand the work burden should not be excessive and he will have time to deal with urgent problems as they arise. The commercial manager therefore will only need a single competent clerk/typist. In view of the responsibility of the post, the commercial manager should be an expatriate in the first instance, with a Somali counterpart. After four and a half years the expatriate should be able to leave having trained his counterpart to take over the post.

4.8 Servicing of Staff

The pilot farm was sited so that it would be constructed quickly and easily and would not interfere with the subsequent construction works for the remainder of the project. It was also chosen so that it contained a sample of all soil types likely to be encountered within the Project Area. The best site for this was near to Qoryooley and since this was also convenient for access it was decided to locate the project headquarters at the same site; this also has the considerable advantage of reducing travelling time for the advisory staff.

The buildings to be supplied have been described in Annex VIII, Chapter 5 and it is sufficient to state here that provision has been made to house most of the senior staff but it is expected that not all expatriate staff will require accomodation for families and the number of houses has been reduced by one; this implies that one other house will be used as a mess for those on a bachelor basis. The dormitory and mess is very simple accommodation to be used by the field supervisors during their training course.

Apart from buildings, all other services to be provided are at the minimum possible level and no allowance has been made for the provision of furniture except in the case of expatriate housing. There will be a telephone line from the Qoryooley exchange to headquarters but communication between the farms and headquarters will be by VHF radio transmitters and receivers. This VHF system should also be extended to cover the canal operation points together with Janaale, Gayweerow, Qoryooley and Falkeerow barrages but the cost of the extensions to the barrages should not be charged to the project.

Only the minimum number of Land Rovers have been supplied and even senior staff will have to share vehicles. On the farms there will be only motor cycle and the management will have to use Land Rovers from headquarters to transport their staff and their families from the farms to Qoryooley for shopping and recreational facilities.

At each farm only one house has been included in the estimates and this will be for the farm manager. The assistant managers will be recruited locally and will all have to find their own accommodation.

The project headquarters buildings and housing will be constructed with the pilot farm in the first year of the project. To supervise the construction of the pilot farm it will be necessary for all staff to live in or near Qoryooley and allowance has been made in the estimates for renting suitable accommodation for senior staff.

CHAPTER 5

MANAGEMENT OF PROJECTS

5.1 General

The Faraxaane, Golweyn and Shalambood projects are similar to the Qoryooley project with only minor engineering differences. Therefore the same management system should be imposed. The Asayle project is also similar to the Qoryooley project except that it allows for the inclusion of some large farms. Since it is the same as Qoryooley in all other aspects and it is adjacent to Qoryooley it also should have the same management structure. The Mukoy Dumis project is different in that only one cropping season is allowed, but the level of engineering works is similar to Qoryooley and crops will also be introduced which will require the farmers to have special training if they are to grow them successfully. Therefore the Qoryooley type of management is considered appropriate except that only one pilot farm is required for the Study Area and the staff and building requirements for other projects can be correspondingly reduced.

5.2 The Der Flood Project

The der flood project is based on the production of sesame using a single irrigation prior to planting, and small amounts of maize and cotton. These are basic crops and the method of irrigation is already widely practised in the area. Irrigation will only take place when water is plentiful and the distribution system proposed is very simple. Provision has however been made for a surface drainage system which will require pumping. The whole operation is similar to the existing system in the Study Area and it is considered that the whole of the management could be operated by the regional co-ordinator's staff. Care will have to be taken to ensure that, on commissioning, the new system is utilised to the best advantage and that the most suitable varieties of seeds etc. are made available. The extension services are dealt with in Chapter 6.

5.3 The Banana Drainage Project

For this project a great deal of field work and trials are required before the final engineering designs are made and the project implemented. It is suggested that the ENB should be responsible for the early stages of the project. It is proposed that one year is devoted to establishing trials and three years to the actual trials.

During the trial period a detailed survey of the area to be drained should be undertaken so that when the decision is taken to implement the project, the design and construction of the main drain can be commenced without delay. There should be no particular problems with the construction of the main drain and its operation and maintenance should be straightforward, involving only an open drain and a single pump station.

The scheme is designed so that farmers can themselves install field drains and deep collector drains and pump from the deep collectors into the main drain. The field drains will have to be installed when the fields have been cleared of bananas so this will obviously be a long process. The farmers will probably need

credit on favourable terms for installing field drainage. Their present financial status is such that most farmers could not afford the drainage and there is no indication that the situation will improve before drains are installed. Credit could be granted directly from the Somali Development Bank or through the ENB. The granting of credit and supervision of on-farm construction would be the major task of the management of the project. It is debatable whether the management should be the responsibility of the Ministry of Agriculture or the ENB, but after the main drain has been constructed, the operation and maintenance could be handed over to the regional office which has experience of similar work in the area. The work of supervising credit and construction can be transferred from the project authority to the ENB itself after the majority of the field drains have been installed.

5.4 Monitoring and Evaluation

The monitoring of progress on projects is an important task and the data obtained should be made widely available. This is particularly the case with the Qoryooley pilot farm where the experience gained will be the key to the success of all similar projects and be of considerable benefit to the development of irrigated agriculture in the Shabeelle Flood Plain. The project staff should provide regular reports on progress and the importance of this information warrants the widest possible dissemination of information. It is recommended that a special monitoring and evaluation unit be established under the State Planning Commission. This unit need only be very small, consisting of an agronomist and an economist. Such a unit will also serve to identify specific problems which are widespread in the region and require attention or further development work.

5.5 Training of Surveyors

For all the projects proposed, detailed maps at a scale of 1 : 10 000 with contours at 0.25 m intervals will be desirable. These can be prepared at the time of the feasibility study but this is an expensive and time-consuming procedure. It would be preferable for these areas to be surveyed in advance and it is recommended that an experienced expatriate surveyor should lead the surveys and train Somali land surveyors. This could be done either within the Ministry of Agriculture or through the Survey and Mapping Department at the Ministry of Defence.

CHAPTER 6

DEVELOPMENT ZONES

6.1 Introduction

The development zones may be divided into two types; those where bananas are significant, such as the Primo Secondario banana zone and the Degwariiri, Janaale and Waagade zones, and the remaining zones where bananas are a negligible part of the area (see Chapter 4, Table 4.2). For clarity, the discussion of improvement of development zones has been divided into banana areas and non-banana areas. This division should not be allowed to obscure the fact that bananas are grown in other development zones and annual crops are grown by workers in the banana zones.

6.2 Banana Zones

The export of bananas is important and accounts for almost 20% of the country's foreign exchange earnings. The industry is in decline and needs Government initiative urgently. The banana drainage project has been proposed as one method to assist the industry, but there is a great deal to be done apart from that. The major improvements needed are summarised below.

6.2.1 Marketing

On average, bananas require harvesting every ten days. The ENB must ensure a regular supply of ships. It is considered that this is the first stage in improving production because it will ensure greater returns to the farmer and a greater confidence within the banana sector.

6.2.2 Training

It is essential that technical staff obtain sufficient knowledge and experience of good crop management and packing as the first step to training other members of staff and most of the farmers. This can be done in two ways. Staff can be given a period of practical training in other banana producing countries. Conversely, experienced expatriate staff can be recruited in order to carry out an extension and training programme. It also must be remembered that several farmers in the Study Area are sufficiently experienced to undertake this work and should be encouraged to do so.

6.2.3 Research

The technical section of the ENB should instigate a research programme immediately. It is important to determine proper fertiliser, nematode control and irrigation requirements as well as screen new varieties. This research can be carried out on ENB farms in the Study Area.

6.2.4. Seed Multiplication

Until qualified and experienced staff are available and proven nematode control methods are determined, the ENB nursery will not be able to provide healthy planting material. Therefore, it is recommended that this service be abandoned until a later date. It may also be necesary to choose a new site for this nursery in order to minimise the risk of renewed nematode infestation. It is important to commence work on this programme immediately.

6.3 General Development Zones

To enable the improvement of the development zones the recommendations made in Annex VI, Chapter 32, should be followed. These are summarised below.

6.3.1 Seed Multiplication

Present facilities at the Afgooye seed multiplication centre are not large enough to provide sufficient stocks of pure seed for more than one or two projects, even on a basis of supplying replacement stocks every five or six years. Therefore, it would be necessary to greatly expand the number of seed multiplication farms, but this would be very costly. However of the recommended annual crops, only maize and cotton require properly supervised multiplication because:-

(a) Cross-pollination is a risk with maize, even for composite varieties

(b) All harvested cotton must be ginned at Balcad to obtain cotton seed for planting.

Therefore, it is recommended that seed multiplication centres concentrate on composite maize varieties and only the maintenance of pure stocks of recommended varieties of other annual crops. Separate facilities must be made for cotton and should, logically, involve the large cotton scheme at Balcad itself. For the remaining crops, such as rice, sesame and groundnuts, a properly organised seed inspection service will be required to carry out the following tasks:-

(a) Advising project technical staff and extension services on simple methods of maintaining good seed stocks by careful and selective harvesting

(b) Inspection of retained seed stocks

(c) Organisation of farms or projects to multiply stocks under supervision of the inspection serice and for direct sale to ONAT.

Consequently, only well qualified and experienced staff will be required to enable maintenance and multiplication of seed of acceptable purity.

6.3.2 Extension Services

Present services involve extension work with smallholders, supervision of co-operative group farms and operation of the Plant Protection Service (PPS). The continued operation of a separate service for pest control work is not recommended. Advice and training on pest control work should be part of general extension work. It is considered that each village is capable, through its village committee, of organising the supply of any equipment needed. Therefore, the extension services only require trained field assistant to work in the villages within the development zones.

There are estimated to be between 8 000 and 9 000 families within the development zones. Assuming that full development of these zones will take 20 years, between 400 and 450 farmers must be taught each year. If one field assistant works with 10 farmers each year, nearly 100 field assistants will be required within the nine development zones (assuming a 100% loss rate of extension staff). Field assistants should be graduates from the Afgooye Agricultural Secondary School and they must obtain supervised practical experience at a suitable project before working in the villages.

It is also recommended that full use is made of the Janaale farmer training centre. Practical courses are necessary to cover more complicated subjects which will be more difficult to teach in the villages, such as irrigation, field levelling and pest control methods. A further five assistants should be allocated to the farmer training centre. Two experienced technical officers, with at least diploma level qualifications, will also be necessary to supervise these extension services.

6.3.3 Agricultural Supplies

One of the major infrastructural developments needed for the Study Area development zones is the establishment of small ONAT sub-depots similar to the buying stations provided by the marketing agency, the Agricultural Development Corporation (ADC). Ideal locations are the large villages in which ADC operate buying stations with at least one sub-depot per development zone. Each sub-depot should carry adequate fresh stocks of recommended fertilisers, chemicals, seed, hand-operated equipment and tools.

6.3.4 Tractor Hire Service

Poor availability of tractors for land preparation is another constraint to agricultural development. For development zones, the estimated number of tractors required by the ONAT hire service is given below.

The estimated net cultivable area of all the development zones is between 12 000 and 14 00 ha at full development. The maximum daily requirement for land preparation is taken to be 0.7 tractors per 100 ha. Therefore, at full development of all nine zones and assuming an operational efficiency of 60%, the ONAT hire service will require about 140 to 170 tractors; i.e. approximately 15 to 20 tractors per development zone. About 30 ploughs and harrows, and 60 tool-bars and sets of attachments will also be needed. Coupled with this, an improvement in operator skills and tractor maintenance is necessary if any increase in this hire serice is to be effective. ONAT must instigate a suitable training programme.

6.3.5 Marketing (ADC)

At full development of the Qoryooley project, it is estimated that present storage facilities at Qoryooley and Shalambood will effectively be fully utilised during each harvesting period (August to September and December to February). Therefore, any further development will require expansion of storage facilities and organisation of tansportation.

6.3.6 Rice Milling

At full development it is estimated that rice production from the Study Area, excluding the Qoryooley project, will be about 180 000 quintals per year. Assuming 65% milling and a daily milling output of 120 q/d, this annual production will require 1 000 days of milling. If one mill operates for 330 days per year, this represents the total capacity of three mills. Therefore, at full development, three more mills similar to those already at Shalambood will be required.

The need for expansion of many aspects of the agricultural services will be readily apparent (for example, the need to store surplus produce or mill rice), but planning will be needed to ensure that these facilities are provided. It must emphasised here that a general improvment of extension services and an increase in the numbers of tractors is required now, otherwise the increases in yields will not take place.

6.4 Engineering Work

The improvement of the canals in the development zones will require some minor engineering work on the canals. This work will be of a simple nature involving surveying, control of earthmoving machinery, replacement of water control gates, minor repairs to concrete structures and perhaps the construction of new concrete canal regulators. There is no-one qualified to do this work in the regional co-ordinator's office, but it is considered that the work should be within the capability of a practical graduate engineer. It is recommended that such an engineer should be attached to the regional co-ordinator's staff to enable the improvement of the development zones to proceed.

CHAPTER 7

IMPLEMENTATION

7.1 Introduction

The comprehensive development of some 70 000 ha is a major task which requires considerable planning. The development projects are all separate units which are independent of one another and each can be developed independently. There are cases where two projects may be profitably combined, such as Qoryooley and Asayle or Golweyn and Shalambood, but this does not alter the fact that each is independent and can be considered in isolation. There are two tasks which should be undertaken as soon as possible - the formation of the Shabeelle River Authority and the repairs to Janaale barrage. These are discussed in the following sections.

7.2 The Establishment of the Shabeelle River Authority

The terms of reference for the study applied only to the Study Area and did not include for a review of the whole Shabeelle Flood Plain. However, a study of the availability of water had to include an examination of irrigation along the river outside the Study Area and the operation of Jowhar offstream storage reservoir. The computer operation analyses were carried out throughout the period of the study and constantly refined but they are by no means exhaustive and finite. However, they clearly show that, at present, there is a shortage of water in one year in four in June and July. Clearly the successful operation of Jowhar offstream storage reservoir is essential for the development of new projects and the improvement of yields in existing areas. The proposed Shabeelle River Authority would operate the reservoir, collect and record all hydrological and development data and control irrigation in the flood plain. It should be established before further development is implemented.

7.3 Repairs to Janaale Barrage

Janaale barrage is the key to successful agricultural production in the Study Area since more than half the area under irrigation receives its water from canals controlled by this barrage. The main gates on the barrage need to be replaced and planning of this work should commence as soon as possible so that the main works and repairs may be done during the dry season at the beginning of 1980.

There is a deep scour pool immediately downstream of the apron and this must be examined and filled urgently.

7.4 Ranking of Projects

The projects have been subject to a conventional economic analysis and the results, in order of merit, are given in Table 7.1.

The ranking in Table 7.1 should only be taken as a general guide since other factors, such as the element of risk involved, should also be taken into account. Furthermore, it is not considered advisable to rank projects solely on

the basis of internal rate of return, the net present value is often considered the most reliable guide but in this case the ranking according to net present value per hectare is the same as the ranking according to the internal rate of return.

TABLE 7.1

Economic Ranking of Projects

Project	Internal rate of return (%)	Net present value at 10% discount rate ('000 So. Shs.)	Net present value/ha (So. Shs.)
Banana drainage	15.0	11 428	7 326
Golweyn	13.1	12 401	6 621
Der flood	12.6	3 083	3 211
Shalambood	10.9	8 293	1 918
Qoryooley(1)	10.2	2 208	552
Faraxaane	9.0	-8 616	-2 154
Mükoy Dumis	8.1	-7 024	-4 527
Asayle	6.1.	-12 236	-8 358

Notes : (1) Economic analysis for Qoryooley, based on Master Plan analyses which are slightly different from feasibility study analysis, in order to make the project directly comparable with other projects.

Source : Annex VIII

Social benefits may also be taken into account, for example more people may benefit from a particular project. Most of these projects have a labour constraint in the der season which limits the area which can be worked by one family to 2 ha and this has been adopted as a standard project criterion. In most cases only a slight increase in population is permissible, the two exceptions to this being the der flood project and the Mukoy Dumis project where there is the possibility of bringing in larger numbers of people. In most cases the value of existing production is a major factor in determining the returns to a particular project, but this is restricted to some extent by the recommendation to limit gu cropped areas to the existing levels, due to water shortages in the gu season.

The Study Area cannot be considered in isolation from the rest of Somalia and it is not possible to propose that all the projects identified should be implemented without considering opportunities for investment outside the Study Area. There are no established criteria for investment decisions in Somalia and the decision to proceed with a project must be made on the basis of direct comparison with alternatives. Therefore it is not possible to make definite recommendations for all the projects identified here, but an internal rate of return of between 8 and 10% is often regarded as the minimum acceptable.

Table 7.1 clearly shows that the banana drainage project is the most worthwhile investment. Yields are declining rapidly and, since the project is a long-term one, work should commence as soon as possible so that the benefits will occur before the banana industry deteriorates further.

The second ranked is the Golweyn project which has an internal rate of return of 13.1%. This is adjacent to the Shalambood project with an internal rate of return of 10.9%. These two projects are in the area originally covered by the State Planning Commission rice project and therefore could not be considered for the feasibility study at the time of the Inception Report.

The third highest ranking (coming between the Golweyn and Shalambood projects) is the der flood project. This has a very good internal rate of return (12.6%) and a feasibility study should be done as soon as possible.

The Qoryooley project has an internal rate of return of 10.2% when analysed in the same way as the other Master Plan projects. Since this project is more advanced than others and since the feasibility study has already been prepared, this project could proceed immediately provided that the internal rate of return of 10.2% is acceptable in general planning terms of the Somali Government. It should be noted that the internal rate of return for the feasibility study was 9.6%. The difference between this figure and the Master Plan figure is mainly attributable to the fact that the costs of applied research work have distorted the ranking. Those costs are needed for the first project to be implemented, whichever it is.

The Faraxaane project has an internal rate of return of 9%. This project must come lower down in the priorities for implementation but may be considered worthwhile if no other projects outside the area can yield greater incremental benefits.

The Mukoy Dumis project is different from those previously considered in that the area is not widely cultivated at present and costs of clearance of light bush have been included.

Little water is used during the gu season in the area at present and, as there is no surplus water at that time, cropping must be limited to the der season. On the other hand this constraint on water supplies may be applied to the whole of the Shabeelle Flood Plain and if there is a need to settle people this scheme provides one opportunity although naturally the benefits are lower than for those projects for which a greater cropping intensity may be established. However, although this area is the best that could be found within the Study Area and the bush is not very dense, it is very broken and pumping will be required. It is probable that better areas occur elsewhere within the Shabeelle Flood Plain.

The Asayle project has a very low rate of return and poor repayment prospects. The decision to proceed with a feasibility study for this project should await the result of the Qoryooley project. The need to assess progress on the Qoryooley project before commencing work on further feasibility studies is paramount. The amount of work involved justifies the establishment of a special unit consisting of an agronomist and an economist. This monitoring and evaluation unit will be concerned with the study of progress on the field trials on the Qoryooley project and the success of the implementation. Ideally, the unit should be attached to the State Planning Commission since the reports of the unit will be relevant to the whole of agricultural development within Somalia and the unit should be established in year 4 and initially attached to the Qoryooley project.

7.5 Development Zones

Improvement of development zones is required and recruitment, training and staffing should commence immediately. The highest priority should be given to extension work in the banana zones since the present rate of decline of yields may lead to farmers abandoning banana plantations within the next few years.

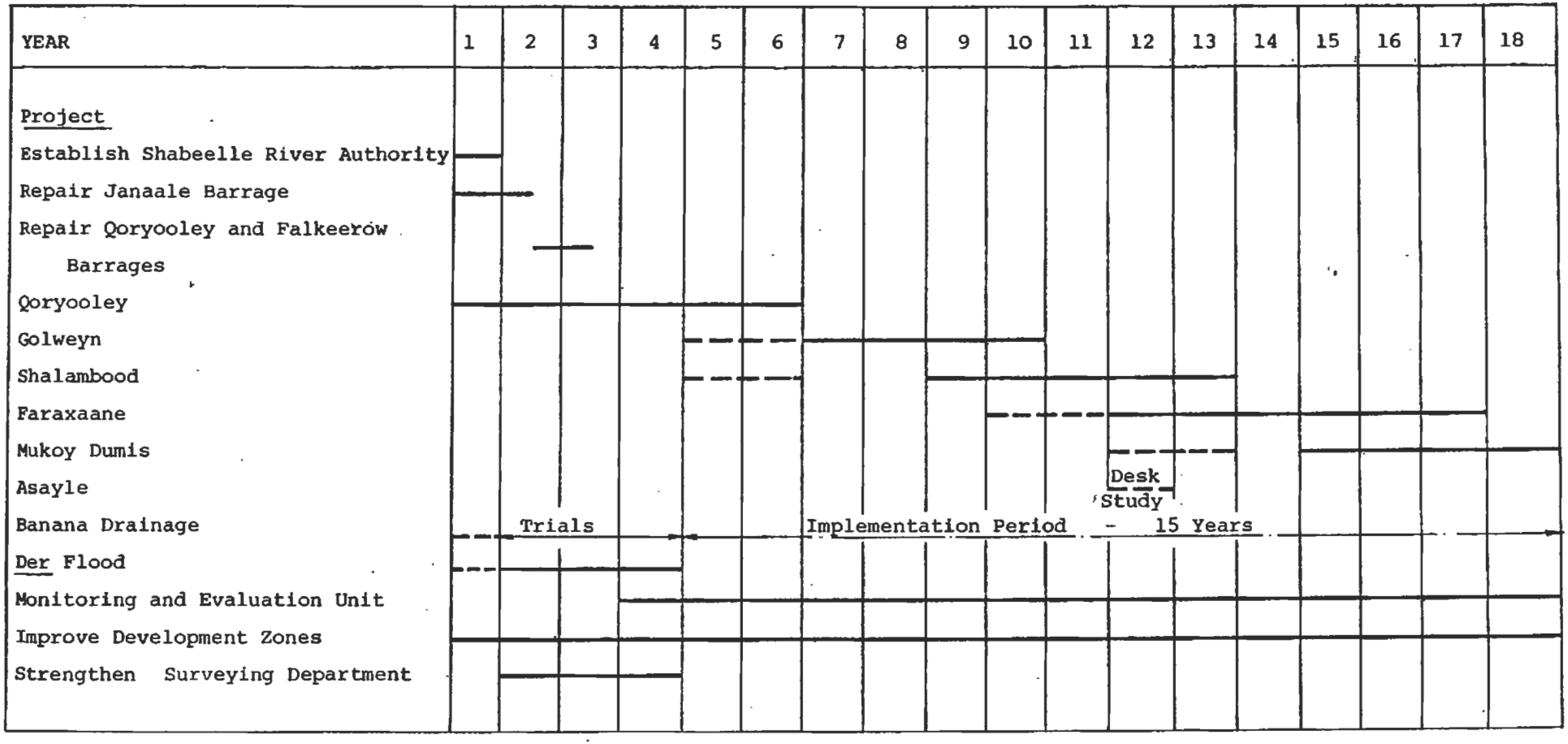
7.6 Expansion of Surveying Facilities

For all feasibility studies, detailed surveys will be required. Time can be saved if the maps are available in advance and there would be a substantial saving if the majority of this work could be undertaken by Somali surveyors. At present the Survey and Mapping Department has not sufficient personnel to do this work and the recruitment of an experienced expatriate surveyor to train surveyors and supervise the mapping is recommended.

7.7 Programme of Implementation

The programme for implementation of the project works is shown in Figure 7.1. The main feature of this programme is that comprehensive projects similar to the Qoryooley project have been spread over a long period in order to reduce the problems of implementation. The Qoryooley project should be implemented first because studies are advanced and a delay of two years would be inevitable if a project with apparently greater benefits was to be selected. The programme for the start of the Qoryooley project has been arranged so that field tests on the pilot farm may commence at the beginning of year 2. Therefore by the end of year 4 there should be tangible benefits from this field work. At this stage the feasibility study for the Golweyn project could commence and would be able to take into account the experience gained on the relevant soils and climatic conditions. Since the Shalambood project is adjacent to the Golweyn project the feasibility study should be done at the same time although implementation should be phased to start later. The Faraxaane and Mukoy Dumis feasibility studies are timed to allow the commissioning of project areas to take place at an even rate after completion of the Shalambood project. In the case of the Asayle project, because of the low internal rate of return, it is recommended that a further desk study is made later to check the viability of this project in the light of information gained during implementation of the Qoryooley and Golweyn projects.

MASTER PLAN - PROGRAMME OF IMPLEMENTATION



Key ——— Feasibility Study

——— Implementation

Figure 7.1

All other projects may commence immediately but priority should be given to the establishment of the Shabeelle River Authority and repairs to Janaale barrage. The banana drainage project will be of long duration and since the benefits are considerable and preliminary trials are required, work should commence as soon as possible. The der flood project is also very profitable even though it is comparatively small. It is recommended that the feasibility study for this project should be done concurrently with the banana drainage project since much of the engineering, economic and basic agricutural expertise would be similar.

The strengthening of extension services in the development zones should also commence immediately and the general expansion of ONAT and ADC services should be phased to meet the growing production needs. The improvement of tractor hire facilities, and the training of drivers, should be commenced at once.