

**THE WORLD BANK GROUP ARCHIVES**

**PUBLIC DISCLOSURE AUTHORIZED**

**Folder Title:** Staff Appraisal Report - May 25, 1978 - Report Number 1945 MAI

**Folder ID:** 24544I

**Project ID:** P001604

**Dates:** 05/25/1978 - 05/25/1978

**Fonds:** Records of the Africa Regional Vice Presidency

**ISAD Reference Code:** WB IBRD/IDA AFR

**Digitized:** 2/26/2020

To cite materials from this archival folder, please follow the following format:  
[Descriptive name of item], [Folder Title], Folder ID [Folder ID], ISAD(G) Reference Code [Reference Code], [Each Level Label as applicable], World Bank Group Archives, Washington, D.C., United States.

The records in this folder were created or received by The World Bank in the course of its business.

The records that were created by the staff of The World Bank are subject to the Bank's copyright.

Please refer to <http://www.worldbank.org/terms-of-use-earchives> for full copyright terms of use and disclaimers.



THE WORLD BANK  
Washington, D.C.

© International Bank for Reconstruction and Development / International Development Association or  
The World Bank  
1818 H Street NW  
Washington DC 20433  
Telephone: 202-473-1000  
Internet: [www.worldbank.org](http://www.worldbank.org)

**PUBLIC DISCLOSURE AUTHORIZED**



245441

R1984-017 Other #: C-28

12374B

Staff Appraisal Report - May 25, 1978 - Report Number 1945 MAI

**DECLASSIFIED**  
WBG Archives

MADE IN U.S.A.      NO. 753

**Oxford**®

ESSELTE

MAI. Shire Valley 3  
Credit: 823-MAI BIR

**DECLASSIFIED**

JAN 11 2016

WBG ARCHIVES

Document of  
The World Bank

FOR OFFICIAL USE ONLY

**FILE COPY**

**RETURN TO EASTERN AFRICA  
INFORMATION CENTER**

Report No. 1945-MAI

STAFF APPRAISAL REPORT

MALAWI

SHIRE VALLEY AGRICULTURAL CONSOLIDATION PROJECT

May 25, 1978

Regional Projects Department  
Eastern Africa Projects, Southern Agriculture

This document has a restricted distribution and may be used by recipients only in the performance of their official duties. Its contents may not otherwise be disclosed without World Bank authorization.

Staff Appraisal Report - May 25, 1978 - Report Number 1945 MAI

**Archives**  
The World Bank Group

83394F Other #:

245441



#### CURRENCY EQUIVALENTS

Currency Unit	=	Malawi Kwacha (MK) = 100 tambala (t)
US\$1.00	=	MK 0.91
MK 1.00	=	US\$1.10

#### WEIGHTS AND MEASURES

1 kg	=	2.2 lb.
1 m ton	=	1.1 short tons (= 2,000 lb.)
1 ha <sub>2</sub>	=	2.47 acres
1 km <sup>2</sup>	=	0.3861 mi <sup>2</sup>
1 km	=	0.6 mile
1 bag maize	=	90 kg (200 lb.)
1 bag fertilizer	=	50 kg. (= 210 lb.)

#### ABBREVIATIONS

ADMARC	-	Agricultural Development and Marketing Corporation
CSC	-	Cold Storage Company
EPA	-	Extension Planning Area
FMD	-	Foot and Mouth Disease
KRDP	-	Karonga Rural Development Project
LLDP	-	Lilongwe Land Development Program
MANR	-	Ministry of Agriculture and Natural Resources
MOE	-	Ministry of Education
MOH	-	Ministry of Health
MOW	-	Ministry of Works and Supplies
MYP	-	Malawi Young Pioneers
NRDP	-	National Rural Development Program
SVADP	-	Shire Valley Agricultural Development Program

#### GOVERNMENT FISCAL YEAR

April 1 to March 31

MALAWISHIRE VALLEY AGRICULTURAL CONSOLIDATION PROJECTTABLE OF CONTENTS

	<u>Page No.</u>
I. THE AGRICULTURAL SECTOR .....	1
A. Background .....	1
B. Smallholder Production .....	1
C. Livestock .....	3
D. Government Agricultural Services .....	3
II. THE PROJECT AREA .....	4
A. The Project Area .....	4
B. The Shire Valley Agricultural Development Program ..	6
III. THE PROJECT .....	11
A. General Description .....	11
B. Detailed Features .....	13
C. Project Cost .....	22
D. Financing .....	23
E. Procurement .....	23
F. Disbursement .....	24
G. Accounts, Audit and Reports .....	25
H. Environmental Effects .....	26
IV. ORGANIZATION AND MANAGEMENT .....	26
V. PRODUCTION, MARKETS AND PRICES, AND FINANCIAL BENEFITS .....	28
A. Production .....	28
B. Markets and Prices .....	31
C. Farmer Benefits .....	33
D. Government Cash Flow .....	34
VI. ECONOMIC BENEFITS AND JUSTIFICATION .....	35
VII. ASSURANCES AND RECOMMENDATIONS .....	38

This report is based on the findings of a Bank mission which visited Malawi in August 1977 comprising Messrs. J. Frankel, E. Goetz, D. Lister (IDA); G. Kerkhoven, J. Callahan, W. McDonnell (Consultants).

This document has a restricted distribution and may be used by recipients only in the performance of their official duties. Its contents may not otherwise be disclosed without World Bank authorization.

ANNEXES

1. Supporting Charts and Tables
  - Chart - C - 1 SVADP Organization Chart
  - Chart - C - 2 SVADP Organization of the Extension Staff
  - Chart - C - 3 Project Implementation Schedule
  
  - Table - T-1 Credit Fund Cash Flow
  - Table - T-2 Summary of Project Costs
  - Table - T-3 Withdrawal of Proceeds of Credit
  - Table - T-4 Breakdown of Project Costs into Categories
  - Table - T-5 Incremental Project Production
  - Table - T-6 Farm Budgets at Full Development of Project
  - Table - T-7 Commodity Budgets per ha at Full Development of Project
  - Table - T-8 Fisherman's Budget, One Year's Catch
  - Table - T-9 Government Cash Flow
  - Table - T-10 Economic Cost and Benefit Streams
  - Table - T-11 Project Equipment and Civil Works Schedule
  
2. Selected Documents and Data Available in the Project File

MAPS

- IBRD 13345R - Shire Valley Communication
- 13346R - Shire Valley Agricultural Research and ADMARC, Marketing Location, and Shire Valley Extension Planning Areas
- 13347 - Shire Valley Health Facilities and Borehole Location
- 13348 - Shire Valley Meteorological Data

## MALAWI

### SHIRE VALLEY AGRICULTURAL CONSOLIDATION PROJECT

#### I. THE AGRICULTURAL SECTOR

##### A. Background

1.01 Malawi has a total area of 118,500 km<sup>2</sup>, of which 24,200 km<sup>2</sup> is lake surface. The land area consists of three topographically different regions - the northern mountainous region, the central plateau, and the southern lowlands. Soils are relatively fertile, and the fairly reliable rainfall permits the cultivation of a variety of food and cash crops. Agriculture is the most important sector of the Malawi economy, as it employs some 85% of the population and contributes about 46 percent of GDP (1975/76). The real annual growth of the agricultural sector ranged from 2 to 4 percent in the period 1972/73 - 1974/75, but increased sharply to 8 percent in 1975/76, due to a sharp rise in maize and rice production, resulting from lowered fertilizer prices and good weather. In 1976 agriculture accounted for 94 percent of export earnings; these were derived mainly from tobacco (48 percent of agricultural exports), tea (20 percent), sugar (13 percent), groundnuts (8 percent), and other crops (11 percent).

1.02 The population of Malawi was estimated at 5.2 million in 1976, and the annual population growth rate is about 2.6 percent. The country's average population density is one of the highest in Africa; this density does, however, vary considerably from region to region, with the majority of the population being concentrated in the more southern regions. About 82 percent of the total area is held under customary tenure, and about 8 percent is either freehold or leasehold estates or plantations; the average customary holding is about 1.5 hectares. The remainder is state land mainly devoted to forests and national parks. Over the past decade increased food requirements for the expanding population have been met for the most part through an expansion in cultivated area. This has meant that land more susceptible to erosion has been cultivated and that fallow periods have been reduced. Consequently, land conservation and maintenance of soil fertility through the introduction of improved techniques and inputs has become increasingly important.

##### B. Smallholder Production

1.03 Smallholders account for over 85 percent of all agricultural production. Maize is by far the most important crop, occupying 80 percent of all cultivated land; other major food crops are pulses, groundnuts and cassava and to a lesser extent rice, sorghum and wheat. The main smallholder cash crops are groundnuts, rice, fire-cured tobacco, cotton, pulses and maize; the export value of these crops in 1976 totalled MK 49.4 million (US\$54.3 million), or 35 percent of total export earnings from agriculture. Estates account for the remaining 15 percent of total agricultural production and over 60 percent of agricultural exports (mainly tea and tobacco);

the total value of exports from this source was estimated at MK 80 million (US\$88.0 million) in 1976.

1.04 Government is presently determined to achieve self sufficiency in food staples while at the same time allowing a significant expansion in agricultural exports. However, given the limitation on high quality land available for new cultivation, and the increasingly high cost of reclamation on marginal lands or lands exhausted by continuous cultivation, the main emphasis of current agricultural policy is on a sustained rise in productivity. Government's overall strategy is to attempt to provide a growth climate for both smallholders and estate production. In the past, improvements in smallholder productivity have been sought through two quite different approaches. The more general approach has concentrated on a gradual improvement of extension, land husbandry and farmer training services throughout the country; these efforts have been supported by a few small, low-cost rural development projects (usually funded by the UK or by UNDP) and by special activities and programs (e.g. ox-training, dairy improvement, and tea development). The second approach has been based on the introduction of considerably more expensive and management intensive integrated development programs in four specific areas; these are: the Lilongwe Land Development Projects (LLDP - I, II, and III, IDA Credits 113, 224 and 550), Shire Valley (SVADP I and II, IDA Credits 114 and 363, and Consolidation Phase subject of this report), Karonga (KRDP I and II, IDA Credit 282, and Third Window Loan 1286), and the Lake Shore Rural Development Project, formerly funded by the Republic of Germany (1968-74) and now assisted by the European Development Fund (EDF). All of the above programs are characterized by the provision of infrastructure (roads, markets, water and health facilities, etc.), institution of land improvement and conservation measures, irrigation development, improved extension and other services, and provision of credit facilities. These four comprehensive programs - which are concentrated in the more densely populated areas - will eventually affect one million persons, or 25 percent of Malawi's rural population. While the programs are making a significant contribution to increased agricultural production, a change of emphasis will be needed if the remaining 75 percent of the rural population is to be included in the development effort within a reasonable period.

1.05 In line with the above objective, Government has adopted a National Rural Development Program (NRDP) which will extend and consolidate various development programs over the entire country, but necessarily under a less intensive basis. The NRDP is specifically designed to increase the level of smallholder production through the provision of agricultural inputs and farm services; particular attention will be paid to increasing the efficiency and scope of extension, input supply, marketing and credit services. Under the NRDP, cultivation of new land will be discouraged, and emphasis will be placed on improved productivity on already cultivated areas; attention will also be given to soil conservation, fisheries development, and afforestation. The Ministry of Agriculture will have overall responsibility for implementation of the program, whereas the earlier projects were established under independent authorities. The Ministry will establish eight Management Units covering the whole country, each of which will be responsible for one Agricultural



Development Division (ADD). On average, each ADD will be divided into five Development Areas (DA), each covering about 25,000 farm families. The present plan calls for a 15-18 year development period for each DA, which would be divided in four phases - a preparatory phase, an extensive phase, an intensive phase and a consolidation phase. The four major development programs (Lilongwe, Karonga, Lake Shore and Shire) are being adjusted where necessary during their present phases to fall into line with the overall concepts of NRDP. The area of the SVADP is the same as the NRDP/Ngabu management unit; therefore, the Project is consistent with national planning for NRDP development.

### C. Livestock

1.06 Malawi's total cattle population was estimated at over 700,000 in 1976; the herd is growing at a rate of about 5 percent per annum, and offtake rates are not generally higher than 10 percent. Most of these cattle are located in the central and northern regions, although there is a fairly heavy concentration of stock in the Shire Valley (8 or 9 percent of the total). The cattle are raised for the most part by traditional methods, and are valued mainly as a source of wealth; livestock are only to a limited extent integrated into the existing development programs. The Government is making improved breeds and artificial insemination services available in the livestock sub-sector. Other Government activities include the establishment of a fattening ranch, and the introduction of stall feeder schemes (to introduce cattle raising to farmers who were previously not familiar with animal husbandry). With the expansion of these schemes, Malawi has achieved self-sufficiency in better grade beef, however, domestic production of lower grade beef is still insufficient. Pigs are mainly raised by estates; slaughterings of pigs increased by an average of 30 percent per annum between 1973 and 1976, when Malawi became self-sufficient in pork.

### D. Government Agricultural Services

1.07 The Ministry of Agriculture and Natural Resources is primarily responsible for the provision of services to the agricultural sector. It operates through four departments: Extension and Training (which provides farmer services throughout the country), Animal Health, Research (with particular specialization in agricultural economics, cattle breeding and pasture improvement), and Technical Services (which supervises land use planning, settlement schemes and irrigation programs). The Ministry is also responsible for the four major agricultural development projects (para 1.04), through which almost all organized smallholder credit in Malawi is provided.

1.08 The Ministry of Agriculture also exercises general supervision over the activities of the Agricultural Development and Marketing Corporation

(ADMARC) - the most important institution involved in the marketing of smallholder produce. ADMARC buys, stores, processes and markets (both locally and abroad) all marketable cotton and tobacco grown in Malawi and is also empowered to purchase all produce grown on customary land. ADMARC views itself as a residual buyer of smallholder produce, purchasing only that output which farmers choose to market through it. A large amount of marketed smallholder produce is either sold or bartered among the farmers and at local markets; ADMARC's maize purchases, for example, represent only a small portion of the marketed total. In addition, ADMARC implements Government's price policy and supplies inputs to smallholders. Commodity prices are established by ADMARC (with the approval of the Minister of Agriculture) and its official price list includes most cash and subsistence crops. In recent years ADMARC has accumulated substantial profits from trading crops such as tobacco, cotton, and groundnuts. ADMARC's profits from crop trading reached a record level of MK 22.7 million in 1976/77. With its profits from crop trading, ADMARC has been able to expand its investments and loans; these reached MK 50.7 million in 1976/77, as compared to MK 39.1 million in 1975/76. Most of ADMARC's investments and loans in recent years have been to estate agriculture and non-agricultural commercial and industrial enterprises. ADMARC also devotes part of its turn-over to a price-equalization reserve to stabilize domestic commodity prices, and maintains a small food reserve stock. It maintains 52 main storage depots, and over 700 temporary produce buying stations; in addition it operates tobacco and groundnut grading centers and seed production farms. ADMARC also supplies fertilizer, seed, and agricultural equipment to smallholders. The Cold Storage Company, is involved in the marketing of smallholder produce. It is a residual buyer of cattle at official auctions, and currently handles about 20 percent of all cattle marketed.

## II. PROJECT AREA

### A. Shire Valley

2.01 The Project area comprises the administrative districts of Chikwawa and Nsanje making up most of the Lower Shire Valley covering some 6,720 km<sup>2</sup> in the southern part of Malawi (see maps). The valley floor is an elongated alluvial plain about 144 km long and 16-32 km across, whose height above sea level changes gradually from 150 meters at the foot of the Valley escarpment to 60 meters along the Shire River. Some 295,000 ha (or 44%) of the total land area consists of national parks, game reserves, forest reserves and controlled areas. Some 63,000 ha or (9%) is covered by marsh, and 10,500 ha (1.5%) is used by the Sugar Corporation of Malawi (SUCOMA). This leaves about 300,000 ha (45%) available for settlement and/or cropping. The 310,000 people living in the valley represent 6% of Malawi's population. The overall population density is about 36 persons per km<sup>2</sup>; however, as the majority of people live on the valley floor, the density there is about 150 per km<sup>2</sup>. The approximately 70,000 smallholder families in the Project area cultivate an average of about 1.5 ha each. Available data indicates family size to be between 4 and

5 members. Land is held under customary tenure and inheritance is patrilineal. Average annual income for all Valley smallholders is calculated at \$75.00 per family or \$15.00 per capita assuming 5 in a family. The figure includes the value of home consumed food crops. No allowance has been included for livestock sales since only 12-13% of farmers own all the Valley cattle. If, however, an allowance for reported cattle sales were added to gross Valley income it would increase average per capita income to \$18.00. This would be equal to about 14% of the national per capita average of \$132.00.

2.02 The valley floor has marked wet and dry seasons of about six months each, and the annual rainfall averages 750 mm (see meteorological map). Temperatures are highest in October/November prior to the onset of the rains, and lowest during the period June/July. The soils on the escarpments are generally poor and unsuitable for crops, but those in the valley, predominantly cracking clays and alluvials, can support sustained cropping under both rainfed and irrigated conditions. There is ample surface water, and a good supply of groundwater throughout most of the Valley.

2.03 The major dryland crops of the Lower Shire Valley are cotton, maize, bulrush millet, sorghum and groundnuts. Pigeon peas and cassava are locally important in hill areas. Rice is grown along the Shire floodplain, some of it under irrigation, and irrigated sugarcane is a major estate crop. The valley is one of the best natural grazing areas in Malawi as the extensive marshes and riverine flats provide excellent dry season fodder. The total cattle population is about 60,000 head and there is also a large goat population. Fish, mostly from the marshes, is an important valley product, both for local consumption and for export to surrounding areas; the yearly fish harvest has grown from 90 m tons in 1956 to the present range of 7-8,000 m tons.

2.04 Travel in the valley has been radically transformed and improved with the recent completion of the bitumen road from Chikwawa to Bangula. However, the access roads from the Shire highlands to the valley have always been relatively poor, and are often impassable during the rains. Contracts have been let by the Ministry of Works (MOW) for construction of the Blantyre-Chikwawa road over the escarpment; with completion of this route, the Valley will be easily accessible from the northern urban centers. The river is navigable as far as Chikwawa, and barges from Nchalo (SUCOMA) carry sugar to the railhead at Chiromo. Postal and telecommunications services link Lilongwe, the capital, and Blantyre with all the main centers in the valley. There are five light aircraft landing strips at Nchalo, Ngabu, Bangula, Nsanje and Chikwawa.

2.05 The educational facilities of the area consist of 102 primary schools, two secondary schools, two corresponding college centers, and a number of Kwacha schools concentrating on adult literacy. Government services include police, traditional courts, forestry and veterinary administration, and district council administrative headquarters at Chikwawa, Ngabu and Bangula.

B. The Shire Valley Agricultural Development Program

Phase I

2.06 The Shire Valley has always been considered one of Malawi's most disadvantaged regions in terms of climate, incidence of disease and low agricultural productivity. Consequently, Government has since the late 1960's given high priority to the implementation of a comprehensive development program in this area. The first phase of this program - The Shire Valley Agricultural Development Project (SVADP I) - was initiated in 1968. The Project was aimed primarily at increasing crop production on about 50,000 ha; it included provision for credit to farmers, improved agricultural extension services, settlement of farmers, construction of essential infrastructure such as boreholes and markets, and construction and improvement of crop extraction roads. The project was supported by an IDA Credit (114-MAI) totalling US\$3.7 million, which covered 80% of the overall project cost of US\$4.6 million.

2.07 The project was terminated on schedule on March 31, 1973. The completion report and the performance audit <sup>1/</sup> considered the project to be well conceived, effectively implemented and generally successful. This success was based not only on the achievement of physical targets (see below), but also on the overall impact of the project on the attitudes of those living in the Shire Valley. The project was noteworthy in that it was very successful in involving people at all levels in the rural development effort in an area whose inhabitants had been considered resistant to change. It had an immediate and salutary effect on the populace as a result of the improvement in health standards, the streamlining of administrative services, the training of local staff, and the increased expenditures on basic infrastructure. Once the tangible effects of the central Government's commitment became evident, it also facilitated the political reintegration of the area into the mainstream of Malawi's economic activity. It is generally agreed that these unquantifiable benefits were vital in providing the initial stimulus to the participation and cooperation of the people in subsequent phases. The PPAR pointed out that, although the Project would attain about a 15% economic rate of return, there was little chance that Government could recover more than a minor part of its investment since benefits generated by the Project would remain with the large number of participating smallholders.

2.08 Project Implementation. The physical implementation of the project was generally excellent, as appraisal targets were in most cases either met or exceeded. Achievements with regard to construction of basic infrastructure are detailed below:

---

<sup>1/</sup> Project Performance Audit Report (Credit 114-MAI), October 22, 1975. Report No. 895.

	<u>Appraisal Estimates</u>	<u>Actual</u>
Roads (km)	288	290
Productive Boreholes (no)	156	183
Markets (no)	7	8
Settlement (families)	4,000	340 <u>1/</u>

---

1/ This component was finally deleted from the Project because of political considerations.

The project also increased extension coverage from one sprayer demonstrator per 1,650 farmers to one per 160 farmers. Credit was provided to allow farmers to purchase cotton sprayers and pesticides.

2.09 Extension work and other crop related services were focussed on cotton - mainly because of the lack of a suitable innovative package for other crops at that time. An attempt was made to introduce high yielding maize, but was unsuccessful because the varieties used were not suited for Valley conditions. The purpose of the agricultural extension for cotton was essentially two-fold: (i) to induce the farmers to buy a sprayer and insecticides on credit; and (ii) to induce the farmers to adopt general agronomic improvements. The success of the cotton extension effort can be seen in the table below, which shows the percentage of all farmers owning sprayers (the appraisal target was to have 4,000 sprayer-owning farmers by 1972/73).

	<u>Sprayer-Owning Farmers</u>					
	<u>67/68</u>	<u>68/69</u>	<u>69/70</u>	<u>70/71</u>	<u>71/72</u>	<u>72/73</u>
Number	200	853	1,819	2,994	5,364	4,800 <u>1/</u>
% of all farmers	1.2%	5.2%	10.7%	14.4%	25.2%	21.8%

---

1/ Data incomplete for the year.

The success of the extension effort may also be measured by the incremental cotton production achieved over the project period. The appraisal projected that farmers adopting the spraying recommendation would increase cotton yields from 300 kg/ha to 800 kg/ha, and eventually to 900 kg/ha. In practice, average yields of those who sprayed ranged between 800 and 1,000 kg/ha, depending on weather conditions. Incremental cotton production followed appraisal projections closely up to year four; in year five, however, production fell to only one-third the expected level due to unfavorable weather conditions.

Incremental Cotton Production  
(m tons)

	<u>68/69</u>	<u>69/70</u>	<u>70/71</u>	<u>71/72</u>	<u>72/73</u>
Original Project Estimates	750	1,782	2,872	4,126	5,744
Actual	867	1,821	3,004	3,725	2,021

As noted in para 2.07, the PPAR for the Phase I project re-estimated the economic rate of return for Phase I at about 15%; that figure has not been further recalculated, but would now be lower because of the subsequent droughts, the subsequent lowering of intensity of spraying (as now recommended, and reflecting changing relative prices between cotton and insecticides) and the decrease in overall cotton acreages in the Shire Valley (partially the result of reduced financial incentives).

Phase II

2.10 While recognizing the achievements of the first phase, development had been concentrated in the immediate neighborhood of Ngabu (the central valley). It was decided that the second phase project should be a more broadly based rural development program which would provide agricultural and other services and infrastructure in an area adjacent to and including that of Phase I. The project was appraised in June 1972, and an IDA credit of US\$10.5 million (which financed 78% of total project costs of US\$13.5 million) was approved on March 1973, Credit No. MAI-363. The Phase I PPAR was critical of the size and complexity of Phase II and disagreed with the 22% ERR projected for the second phase, these observations, however, came almost three years after the appraisal. The Project included provision for: (i) medium term and seasonal credit; (ii) extension services and a farmer training program; (iii) development of livestock and fisheries, and wildlife protection; (iv) construction of roads, health facilities, crop markets, and rural water supplies; and (v) project administration and agricultural research. The agricultural component was expected to affect some 16,300 farmers, additional to those reached in Phase I, as well as some 1,000 fishermen. The principal aim of the Project was increased crop production on some 52,400 ha, including some 20,000 ha of cotton, 21,000 ha of maize, 7,600 ha of sorghum, 2,800 ha of rice and 1,600 ha of groundnuts. The specific yields and production targets projected at full development in 1976/77 were:

<u>Yields (kg/ha)</u>	<u>Cotton</u>	<u>Maize</u>	<u>Sorghum</u>	<u>Rice</u>	<u>Groundnuts</u>
Unimproved farms	335	675	675	335	450
Improved farms	1,000	2,020	900	2,250	900
<u>Total Production (m/tons)</u>					
Improved farmers	16,700	30,000	850	49,500	135

These projections were based on the expectation that an average of just over 3,000 farmers would annually adopt improved cultural practices. It was also assumed that fish production would increase annually by about 1,260 m tons, and that the annual offtake of beef cattle for sale would increase from 10% to 15%.

2.11 Project Implementation. The success of the project can be measured by two quite different criteria. On the one hand, excellent progress was achieved in completing the project's physical infrastructure; on the other hand, total crop production failed by a wide margin to meet appraisal estimates. Achievements with regard to construction of basic infrastructure are detailed below:

	<u>Appraisal</u> <u>Estimate</u>	<u>Actual</u>	<u>%</u>
Road Construction (km)	304	200	66%
Borehole Construction	140	132	94%
Dips	11	5 <u>1/</u>	100%
Fish Kilns	50	62	124%
Health Posts and Centers	16	15	94%
Markets	17	9 <u>2/</u>	100%
Ox-Training Centers	7	7	100%
Oxen Trained (pair)	250	592	236%

1/ Original target of 11 dips was reduced to 5.

2/ ADMARC decided to limit construction to 9 based on volume in targeted areas.

In spite of these achievements, the viability of the project was threatened by the widespread failure of almost all crops to meet appraisal targets. Total cotton production declined from 15,200 m tons in 1973/74 to 7,600 m tons in 1975/76. Maize dropped from 27,000 m tons to 8,600 m tons. One of the major causes of these drastic declines was the prolonged drought which devastated the area, although low cotton farmgate prices also discouraged production. Many farmers increased their planting of drought resistant sorghum and millet, while sharply reducing cotton planting, in an effort to protect their family food supply. There were, however, additional production related constraints which had not been recognized in formulating appraisal projections. For example, increases in both cultivated area and yields were overestimated, as was the size of the average smallholder cotton area. Moreover, project staff made slow progress in identifying improved maize, sorghum and millet varieties adapted to valley conditions. Consequently, as there was no cereal grain package available to producers, there was little improvement in yields. 1/ Finally project management was almost completely occupied with executing the construction program, and did not take the time required to organize, implement and supervise an effective extension/ training/research unit to support crop production. The table below gives a comparison of appraisal estimates and actual production over the first four project years.

---

1/ However, varieties that showed promise were identified, tested, and multiplication has begun, to form the basis for Phase III packages.

('000 m tons)

	<u>Base Year</u>		<u>73/74</u>		<u>74/75</u>		<u>75/76</u>		<u>76/77</u>	
	<u>72/73</u>									
	<u>Proj.</u>	<u>Act.</u>	<u>Proj.</u>	<u>Act.</u>	<u>Proj.</u>	<u>Act.</u>	<u>Proj.</u>	<u>Act.</u>	<u>Proj.</u>	<u>Act.</u>
Cotton	17.0	14.5	20.5	15.2	22.0	9.6	27.8	7.6	31.5	9.5
Maize	12.2	12.2	21.5	27.0	28.5	12.0	43.0	8.9	44.0	28.4
Sorghum	3.5	3.5	3.6	3.5	3.6	2.7	3.7	4.5	3.7	10.2
Rice	2.2	2.2	2.25	1.8	0.7	2.5	2.5	0.6	2.5	0.7
Groundnuts	0.42	0.42	0.54	0.53	0.90	0.72	1.3	0.62	1.5	0.88

An analysis of these statistics clearly shows the disastrous effect of the drought years 1974/75 and 1975/76. Moreover, although crop yields for all crops returned to normal in 1976/77, cotton production fell by about 25% because of a late season infestation of field mice.

2.12 The project's fisheries and livestock development programs met with somewhat greater success. The fisheries program, which included the construction of kilns and boats and the training of fishermen, was progressing satisfactorily towards achieving appraisal targets. The ox-training and ox-purchase programs were well accepted by farmers, although there was more interest in using the oxen for transport than for land preparation. On the other hand, meat production in the project area declined due to two outbreaks of Foot and Mouth Disease (FMD). This resulted in the prohibition of all livestock movement both within and out of the Valley, and the temporary closing of cattle markets.

2.13 The incremental credit required for the second phase was provided through funds contributed by Government, in-kind contribution from ADMARC, and the cumulative building of credit repayments. Farmers and fishermen received credit in-kind with no down payment. Seasonal loans (10 months) were made at an interest rate of 12% per annum, while medium term loans (3 years) were at a rate of 3.2% per annum. Farmers also benefitted from an ADMARC subsidy on farm inputs, mainly spraying equipment and pesticides. The accounting procedures for monitoring this credit were extremely poor; there was no distinction made between current accounts and outstanding amounts from previous years. A comprehensive analysis of repayment performance was therefore not possible; available data indicate, however, that repayments dropped sharply from the rate achieved under the first phase 1/. Much of

<u>1/</u>	<u>Year</u>	<u>No. of Borrowers</u>	<u>Amount Loaned ('000 MK)</u>	<u>Recovery Rate Rate % (Sept. 1977)</u>
	1968/69	702	39	92
	1969/70	1,255	83	92
	1970/71	1,730	132	96
	1971/72	5,438	218	87
	1972/73	6,760	174	63
	1973/74	10,396	294	80
	1974/75	15,320	335	64
	1975/76	24,031	446	44



the problem can be attributed to crop failures in the drought years, and recent information since appraisal from the field indicates a definite increase in repayments following the improved harvest of the 1976/77 crop season.

2.14 Economic Analysis. The economic analysis of Phase II of the Project, considered as separate from Phase I and the Consolidation Phase now under appraisal, is quite difficult because of interface problems. However, such an analysis will be attempted in detail during the preparation of the forthcoming Project Completion Report for the Phase II project. The normal technical difficulties in this kind of situation are exacerbated in this case by the fact that the exceptionally bad droughts of 1974/75 and 1975/76 have had a massive effect on yields, causing shifts of plantings to subsistence crops. If it is assumed that the results of Phase II are limited to those already apparent, Phase II would show a zero rate of return even if future operating costs are assumed to be cut back solely to those required to maintain the present Phase II (rather than the much heavier levels originally presumed to be needed if Phase II had had the incremental production effect originally estimated). It can, however, be argued that much of what has been done in Phase II has provided the basis for the Consolidation Phase, under appraisal, the economic rate of return for which is some 20% (see Chapter VI); thus it is important to note that when Phase II and the Consolidated Phase are combined, an 8-10% economic rate of return results.

2.15 Planning for the Consolidation Phase has taken particular cognizance of the production weaknesses that developed during Phase II. Consequently, under the Consolidation Phase, there would be a reorganization and intensification of the extension and training component; the research and seed multiplication units would provide extension with complete production packages, which would include drought resistant cereal seed varieties, and moisture conserving cultivation practices. There would also be sharp reductions in infrastructure development which would permit full attention by Project staff to agricultural production. An increase in cotton prices of 17% was announced prior to the 1977/78 planting season, which has encouraged increased plantings. Consolidation Phase crop projections of yields and areas have been adjusted to include an allowance for the risk of recurring dry seasons.

### III. THE PROJECT

#### A. General Description

3.01 The Project would constitute a third, consolidation phase of the Shire Valley Agricultural Development Program; as such, it would be a direct continuation of the second phase, drawing on the experience gained over the past five years. The Project's major objectives are: (i) to increase the number of farmers applying improved crop practices by about 15,000 so that at least 55% of the Valley's smallholders (40,000) will have adopted at least some of the practices by full development in 1982/83; (ii) to provide technical assistance to these farmers to increase land under improved practices

(12% of cropped area) 1/ to about 50,000 ha (47% of cropped area) by 1982/83; and (iii) to provide increased social and infrastructural services directly or indirectly affecting just about all 70,000 families in the Project area.

3.02 Over a four year period (1978/79 - 1981/82), the project would: (i) continue to support development of rainfed agricultural production through reorganization and strengthening of the extension service, provision of improved seed varieties, and through provision of credit; (ii) improve the quantity and quality of meat and fish production; (iii) continue support of the land husbandry program with an added forestry unit; and (iv) extend water, health, and road services. The Project would specifically provide for:

- (a) establishing headquarters for 5 additional Extension Planning Areas (EPA's) with the required staff housing, training and administrative facilities, (see map for location of EPAs);
- (b) establishment of a 150 hectare irrigated seed selection and multiplication farm directed by an expanded research team;
- (c) continuation of seasonal and medium term credit for farm and fisheries inputs;
- (d) construction of additional livestock markets and dips, expansion of FMD and tsetse control, and increasing the ox-training program;
- (e) expansion of the Natural Resources Division to include a Forestry Development Unit, and continue improvement of wildlife facilities;
- (f) groundwater survey and development including construction of 40 additional boreholes and 40 shallow wells, providing consultants' service to review experiences gained under existing irrigation schemes and to undertake an irrigation feasibility study of the Valley;
- (g) continuation and improvement of Project area health facilities;
- (h) completion of the access road network, and maintenance of Project roads, buildings and equipment; and
- (i) continuation and expansion of the Project Evaluation unit, and finance for two years, the position of Chief Planning Officer in the MANR.

---

1/ of which 9300 has are in cotton representing 44% of the total cotton area.

The project would be administered by the Shire Valley Agricultural Development Program (SVADP) management team, (see chart C-1) under the general direction of the Ministry of Agriculture and National Resources. The health component would be administered by the Ministry of Health.

3.03 As is usual for agricultural projects, expenditures on staffing and vehicle operating costs and the like are considered as "capital costs" when they are required for further development; they are considered as "recurrent costs" when they are required to maintain levels of production already attained. In the case of this Consolidation Project, it might normally have been expected that the levels of expenditure originally anticipated as needed to maintain Phase II levels of production would be considered as "recurrent costs" of the Shire Valley project entity during the Consolidation Phase and that "capital costs" for the Consolidation Phase would include only expenditures above and beyond those levels. However, as already noted in the description of Phase II project results (paras 2.11 to 2.14), present production results of Phase II are substantially below expectations. Therefore, the cost of services required to maintain the level of production reached by farmers and fisherman at the end of Phase II have been recalculated (para 3.32) and are considered as "recurrent costs" to be borne entirely by Government during the Consolidation Phase; and all expenditures by the Project entity above and beyond this level are considered as Consolidation Phase project costs. A consistent approach has been taken in assessing the economic costs of the Consolidation Project.

## B. Detailed Features

### Agricultural Services

3.04 Extension. Production increases in the Project area would be primarily dependent upon the effectiveness of the Project extension and farmer training programs organized under the first and second phases. Present staff, although adequate in numbers, have been generally ineffective - mainly because the early recruits had only limited skills and were preoccupied mostly with the construction of basic infrastructure. Under the Project, therefore, the extension system would be reorganized to provide farmers with more regular and up-to-date advice on farming methods and practices. The new system would be based on a carefully scheduled "Training and Visit" program. The program would be instituted and supervised by trained village agricultural extension workers (TA's). Each of these extension workers could cover some 600 farm families, divided into smaller groups of about 100 families (the number would vary according to population density and accessibility). Each group of families would be visited by a TA on a fixed day of the week, once every two weeks. The TA would work primarily with 10 contact farmers selected from each group; other farmers in the group would be encouraged to join the TA in his field visits and discussion sessions. The message communicated would be a simple one, and would concentrate on specific crops and specific farming operations of interest to the farmers at that point in time. The specific message or lesson would be developed by the TA and Project technical officers

at bi-weekly training sessions. The TA would thus spend one day out of every two weeks participating in demonstrations, field trials and administrative activities, so as to prepare for the following two weeks of field work with the designated farmer groups.

3.05 In order to ensure the successful implementation of this program, the Project would improve the present ratio of 1 trained extension worker (TA) per 1,000 farmers. At the present time there are some 75 Technical Assistants (TA's) and 160 Development Assistants (DA's) working with farmers at the village level. DAs, who are primary school leavers with little agriculture training or experience, have been used when technically qualified and trained TAs were not available. During the Project, the number of TA's would be increased by 57 (to 132) and the DA's would be phased out. Some of the new TA's would be promoted DA's, following completion of the certificate course at Colby Agricultural Training College; others would be newly recruited. Since the DA positions are non-permanent, non-pensionable positions, while the TA positions are permanent and pensionable, it was agreed during negotiations that sufficient new TA positions would be established to meet project needs, as follows: 97 positions by May 1, 1979; 112 by May 1980 and 132 by May 1981. At project completion, the 132 TA's would be deployed as follows: 12 in training centers and 120 doing field extension work, providing a ratio of 1 trained extension worker to about 600 farm families. The proposed extension methodology is based on regular and frequent farm visits by extension staff. It is essential, therefore, that field staff and their supervisors live near their work and that they are sufficiently mobile to enable them to function effectively. Despite extensive access road improvements there are many areas of the Valley where four wheel drive vehicles are required during the rainy season which is also the growing season and the most active time for field contacts. The Project would provide staff houses, 1/ offices, 9 4-WD vehicles, 30 motorcycles, 3 extension aid vans with equipment, and a 7-ton truck; provision would also be made for Project vehicle operating costs and staff salaries, which are considered developmental costs (para 3.03).

3.06 Training. The basic extension techniques to be applied under the Project would require a systematic training program for village extension workers (TA's). The TA's would therefore receive intensive instruction from Project specialist staff in those specific agricultural practices and recommendations related directly to the field preparation planned for a given two-week period. Residential and non-residential training sites and facilities were established under the second phase project; new facilities would be provided under the proposed Project for the five new EPA headquarters. Also, two additional staff would be recruited to continue the training for farm women in agriculture and home sciences. This will bring to twelve the number of instructors whose program includes poultry, milk and vegetable production besides participation in planning by farm women. Specifically the Project

---

1/ 60 one-room staff houses (PL type) constructed for DAs will be converted to acceptable EL-2 standard houses by adding required rooms. The conversion has been estimated at MK 2,000 for each unit. New construction of EL-2 costs MK 5,000.

would include provision for: 5 area headquarters training centers; 50 low-cost village unit training centers, one 4-WD vehicle, a personnel carrier, 11 motorcycles, vehicle operating costs and staff salaries.

3.07 Research. The Project Research Unit would be charged with providing the extension service with simple but relevant technological information suitably adapted to the locality and major crop combinations of the five ecological zones identified in the Valley. The Research Unit has four rainfed experiment stations (Ngabu, Tomali, Maperera and Nsanje) which carry out replicated field trials on all major crops grown in the Valley; these stations are operated in close collaboration with the National Research Program and the MANR's research stations at Kasinthula and Makanga. Also, there are 32 one acre (0.4 ha) fenced crop/weather plots distributed within the Project area which are designed to provide information on yields of major crops in the different ecological regions of the Valley. All agricultural research in the Lower Shire Valley would continue to be directed by the Project Senior Agricultural Research Officer, based at Ngabu. The experiment stations and the crop/weather trial plots would be used by the extension TA's for their work sessions with the contact farmers in the "Training and Visit System," and in turn the Senior Technical Officers would use these facilities for training sessions with the TA's. In addition demonstration plots would be established on contact farmers' fields as part of the system. The success of the extension "Training and Visit" system will depend upon effectively coordinating extension, training and research. The Project would include provision for: an office block, a general laboratory and storage building, staff houses, 3 4-WD vehicles, 6 motorcycles, a farm tractor with assorted field equipment, equipment for the research laboratory, vehicle and laboratory operating expenses, and staff salaries.

3.08 Seed Multiplication. The Project would provide for the establishment of an irrigated seed selection and multiplication farm at the existing MANR Makanga Research Station. The Ministry has agreed to assign 150 hectares of the station's land to the Project for this purpose. Since the provision of adequate improved seed for Project farmers is essential, the formal transfer of the land to Project administration and control, would be a condition of Credit effectiveness. The existing irrigation system would be improved and expanded to handle the additional crop area. Selection and multiplication of maize, sorghum, millet, groundnuts, guar beans, and edible beans would be concentrated at the new Makanga seed farm, while cotton and rice seed selection and multiplication would be handled on the more suitable soils of the MANR's Kasinthula Station. At full development, the seed multiplication operation at Makanga would be financially self-sufficient. In addition to developing the irrigation system, the Project would include provision for: an office building, a storage and seed cleaning building, a garage and service bay, staff houses, 3 farm tractors with a full complement of field equipment, one 4-WD vehicle, one 5-ton truck, seed cleaning and drying equipment, and one motorcycle. The Project would also provide for vehicle and seed farm operating costs, and staff salaries for the first two Project years. The farm would require one additional Professional Officer (PO), 2 supervisors and 8 TA's.

3.09 Credit Administration (Table T-1). The credit program initiated under the first two phases of the SVADP would be continued over the Project period. The credit fund balance at the end of the second phase will be approximately MK 1.30 million; this would be sufficient to cover the total credit needs of the proposed Project. Seasonal and medium-term credit would be extended to some 30,000-35,000 smallholder farmers and fishermen. At full development, MK 172,000 in seasonal credit would be extended annually for purchase of fertilizers, along with some MK 342,000 in seasonal credit for pesticides. This credit would be extended at an interest rate of 15% with a 15% downpayment. Medium term credit would be extended at an interest rate of 10% per annum; recovery would be in three equal annual installments. These are existing rates established by MANR. Group credit introduced in the second phase project would be expanded under the Project to lower administrative costs and improve repayment rates; a lower credit charge of 10% for all such loans would be imposed to provide an incentive to form participating groups. The credit cash flow includes a 20% provision for bad debts for seasonal credit and a 5% provision for medium-term credit. The Project would include provision for staff salaries (including 9 additional staff), houses, a 4-WD vehicle, 13 motorcycles, office equipment and vehicle operating costs.

3.10 Animal Husbandry - Livestock Extension. The Project would provide additional livestock extension staff (one professional officer, a supervisory officer and 2 livestock TA's) to the existing staff of 13 technicians to: (i) support the increased marketing, disease control, and ox-training facilities; and (ii) work intensively with livestock owners in an effort to stabilize the valley's cattle herd. The latter objective would require reducing the number of females kept in the herd, and lowering the age of animals to be sold for slaughter from 4-5 years to 2-3 years. Much of the incentive for this will come from the demand for young feeder cattle from within and outside the valley. The Project would provide one staff house, a 4-WD vehicle, 10 motorcycles, operating costs and staff salaries.

3.11 Marketing. The Project would finance an additional cattle market near Nsanje, complete with weighscale, handling yard, and other required facilities. The Khaombe Holding Ground established in the second phase would be enlarged, and would be provided with a water supply.

3.12 Disease Control. The tsetse investigation team established during Phase II will complete the study in the first two years of the proposed Project, however, an early evaluation of field results has indicated a 25% incidence of trypanosomiasis in cattle and the Project will provide for a trypanosomiasis vaccination program. The Project would finance an office/laboratory, a 4-WD vehicle, a motorcycle, laboratory and field camping equipment, and operating costs of the study. Outbreaks of Foot and Mouth Disease have become more frequent, and although they have not seriously affected the Valley's herd growth rate the disease periodically prevents exports of cattle from the Valley and poses a threat to other cattle herds in the country. Under the Project an FMD vaccination program would be initiated by the Veterinary Department. It has been agreed that technical guidance

would be the responsibility of the Animal Virus Research Institute of Pirbright, UK. The Project would finance purchase of a refrigerated vehicle, 2 motorcycles, a camp caravan and field equipment, FMD vaccine, and vehicle operating costs.

3.13 Ox-Training. The Project would support the continuation of the established ox-training program and would provide for additional training centers one each at the five new EPA headquarters. The animal husbandry technical assistants, in cooperation with the crop extension staff, would intensify their efforts to increase the use of oxen for land preparation.

#### Natural Resources

3.14 Land Husbandry. The Land Husbandry Unit of the Project's Natural Resources Division would continue to monitor the ecological effects of the development program and would help develop programs related to long term preservation of the Valley's natural resources. The section would compile and develop data on:

- (a) the classification and current use of land resources;
- (b) present agricultural and other Government services and organization of human resources;
- (c) problems and constraints affecting development of the Valley's potential; and
- (d) physical planning of the area.

The Land Husbandry Unit would work closely with the Extension Unit to provide additional information on early cultivation, plant densities and rotations as they affect retention of soil moisture. It would also act as a technical advisory unit to support possible future development of irrigation potential. The research section of the Natural Resources division organized under Phase II has been incorporated into the Project's Research Unit to ensure better overall coordination of all Project related research and reduce possible duplication of operations. The Project would include provision for the staff and other operating costs of the Unit. It would also provide for 7 additional staff (5 TA's and two supervisory staff), one house, a 4-wheel drive vehicle and a motorcycle.

3.15 Fisheries. The Project would continue and expand the fisheries development program initiated under the second phase project. This program would include construction of infrastructure, extension of credit for purchase of canoes, training of fishermen, and pollution monitoring. Four new centralized boat landings would be constructed, along with some 60 smoking kilns (these were successfully introduced in the second phase to replace the traditional, but inefficient, smoking pit). Seven additional staff would be recruited to assist with the training of 1,000-1,200 additional fishermen in

the use of improved fishing gear and modern kilns. Credit would also be extended to fishermen to enable them to purchase some 500 plank type canoes to be built by an existing factory in this area. Finally the Project would continue an ongoing program whereby regular water, soil and fish samples are sent to the Tropical Products Institute (TPI) laboratory in London for analysis to check on the level of pesticide residues; corrective measures would be introduced where necessary. In order to implement these activities, the Project would include provision for staff salaries, vehicles, a motor-boat, a VHF radio and operating costs.

3.16 Forestry. A Forestry Unit would be established in the Natural Resources Division to oversee implementation of the Project's reforestation program. The program would:

- (a) institute a planting program for the reforestation of those areas, particularly the East Bank and West Bank escarpments, which have been denuded of natural tree cover by the high demand for land, building poles and fuelwood;
- (b) investigate the adaptability of tree species to the Lower Shire environment and encourage the planting of village woodlots and shelter belts;
- (c) increase control of gazetted forests and advise the local authorities on the most economic principles of tree usage and management;
- (d) teach silvicultural techniques and their management so as to ensure optimum tree exploitation and sound conservation measures; and
- (e) attempt to reduce or rectify erosion problems that have arisen due to uncontrolled and indiscriminate tree exploitation.

3.17 A primary goal of the program would be the involvement of the local population in the planting and care of forestry plantations. With this participation, the people would be made to understand the importance of preventing livestock from destroying young seedlings and the need for control of indiscriminate burning. However, because there would be competition for labor at a time when farmers are busy with maize planting and weeding, the tree-planting would have to be started with a regular forestry team supplemented by local volunteer labor. Farmer and villager activity would be increased each year as the planting areas are expanded. The Project's forestry staff would be responsible for organizing, training and supervising all field activity; the staff would include a senior forester and several assistants, including a forest officer with experience in semi-arid zones. Provision would also be made for vehicles (including 2 farm tractors), staff housing and operating costs.



3.18 Wildlife. Wildlife conservation activities under the second phase were concerned with the extension and demarcation of the Mwabvi and Lengwe game reserves and the posting of Game Scouts to monitor activities within these areas. The project also assisted with the development of a road network to facilitate tourism, the construction of fences and game ditches, and the institution of crop protection and anti-poaching measures. The Project would complete these activities. It would include provision for boundary demarcation and construction of fences, and ditches. Existing overnight tourist accommodations in Lengwe, which are in great demand, would be increased from two 4-bed chalets to five chalets with 17 beds; electricity, and running water would be installed and a mobile radio and a telephone system provided to improve communications necessary for tourist arrangements and park administration. Finally the Project would provide staff housing and vehicles. The wildlife activities would be executed by the Senior Game Warden, assisted by a Senior Game Ranger and 19 Game Scouts.

#### Hydrology and Water Supply

3.19 Hydrology. An experienced hydrogeologist would be recruited to investigate hydrogeologic conditions, to conduct hydrology studies, to oversee the construction of boreholes, to assist in the reconstruction of failed boreholes, to determine the location and availability of ground water for public supply and irrigation, and to assist in designing a master plan for water development. The information accumulated would provide the basis for deep drilling exploration of possible groundwater sources capable of supporting irrigation units. The Project would finance purchase of a complete trailer-mounted rotary drilling machine and provide for training for an operating crew; the Project would also finance a gamma ray and electric logger to log all new wells and all old cased wells. This process would provide the Project hydrogeologist with data to locate new wells, to correlate data from well to well to determine the lateral and vertical extent of aquifers and confining beds, and to help determine the ultimate yield of the aquifers for irrigation or other purposes. In order to provide information about the sediment yield of the streams in the lower valley, the Project would establish an 8-station sediment sampling network at existing stream gauging stations, and provide for a neutron probe for soil moisture study. In the Elephant Marsh, staff gauges for marsh water levels have been installed, and new rain gauges will be installed at Kasinthula, Capananga and Nsanje. The Project would finance all operating costs of the water development program, and would in addition provide for 4 staff houses, and several vehicles. Finally, Project funds have been provided to finance a feasibility study for the development of a surface water irrigation project (US\$255,000.00). Since this study will raise irrigation policy issues that will require resolution on a national basis it is a credit condition for funding the Shire Study, for the Government to undertake an initial study which will review existing irrigation schemes, organization, financing and policies. It would examine the justification for irrigation development generally and would suggest revisions where necessary to existing policy so that irrigation expansion takes place in an economic and rational manner. The cost of the National Study has been estimated at US\$225,000.00. The terms of reference and consultants to be used for the Shire study would be agreed with IDA.

3.20 Water Supply. The Project would finance construction, under the supervision of the staff hydrogeologist, of 40 additional boreholes and 40 shallow-wells, both with hand operated pumps for village potable water. The Government Hydrological Department would provide suitable well screens from either local manufacturers or import sources to properly develop the wells' capacity. A program of pumping tests would be started on new boreholes to determine aquifer properties, and during drilling the specific conductance of water encountered would be determined to build knowledge of water quality so as to help solve the problems of salinity. A specific conductance meter would be provided under the Project. To obtain greater village participation in the operation of village water supplies, the agricultural extension field staff, in cooperation with Public Health Workers, would train village teams in routine maintenance. Wells and surrounding ground have generally been badly neglected and contamination and siltation has resulted. Unless villagers assume the responsibility for maintaining well fencing and the concrete surrounds, it would be useless to drill additional boreholes. It will be a condition of disbursement for financing additional boreholes that a program satisfactory to IDA for achieving these objectives has been drawn up, and Government has agreed to implement it.

#### Health

3.21 The Project would continue and expand the comprehensive health program now underway in the Shire Valley. Two new maternity/dispensary sub-centers and four health posts would be constructed. The bilharzia control program would also be expanded by construction of field latrines and village bathing/laundry facilities. The Project would also include provision for three motor vehicles, and 3 motorcycles. The program would be staffed and managed by the Ministry of Health under supervision of the Senior Public Health Officer based in Ngabu working with SVADP management.

#### Technical Services

3.22 Roads. The Project would upgrade and expand the system of secondary and district roads which service the main agricultural areas in the Valley, and would maintain those roads already completed under the first and second phase projects. The new construction would comprise: (i) improvement of 86 km of secondary roads; (ii) improvement of 32 km of district crop extraction and feeder roads; and (iii) construction of 21 km of district roads to fish landings. It was agreed at negotiations that maintenance of main and secondary roads in the Valley would be the responsibility of the Ministry of Works and Supplies (MOW). District roads would be maintained by the Project road maintenance unit during the construction phase. It was also agreed that at project completion MOW (or district councils, if they are suitably equipped) will be responsible for maintaining the district roads. In order to facilitate this program, the Project would include provision for the purchase of a grader, 3 dump trucks, a tractor, a 4-WD vehicle, two motorcycles, equipment, and three staff houses; it would also provide for vehicle and equipment operating costs and for salaries.

3.23 Building and Mechanical Maintenance. The Project maintenance units provide maintenance service for the repair and upkeep of all Project housing, vehicles and equipment. The unit has a well equipped auto and machine maintenance depot and has been able to provide effective repair service for Project equipment. The Project would provide incremental housing (where necessary), two 4-WD vehicles, 5 motorcycles, 1 tractor, 1 dump truck and an assortment of machinery and equipment as well as operating costs for these units.

#### Project Administration

3.24 Project Manager's Office. A total of eleven additional staff would be recruited for the Project Manager's Office. These would include 1 Technical Officer, 2 Senior Technical Assistants (Senior Clerks), and 8 Clerical Officers (typists and clerks). These staff would be required to handle the increased volume of work arising out of the expansion of the program to cover additional smallholders. Housing (where required), offices, equipment and vehicles would also be provided.

3.25 Evaluation Unit. The existing Evaluation Unit has developed a nucleus of experienced field enumerators and supervisory staff, and a technique of annual farm surveys similar to those used by Karonga and Lilongwe Projects. The Project would provide for development of a common computer package program for analysis of the annual farm survey data, and a number of small surveys to be conducted in the field on specialized topics as requested by management. Crop marketing, credit recovery, and unit data bank statistics would also be collated and circulated as routine information. Close liaison would be maintained with other evaluation units of the National Statistics Office and the Headquarters Planning Unit to provide uniformity in field surveys and reporting techniques. Because of the recent wide fluctuations in valley crop production, Project evaluation staff plan to provide management with continuing statistical feedback related to all crop production. A survey design has been prepared which will directly address the agricultural, sociological, and economic factors affecting adoption rates of recommended packages. Results of the monitoring will assist extension, research and training units in shaping their responses to field developments. Additional staff required to assist in the implementation of these activities would be 1 Professional Officer and 16 Technical Assistants (enumerators and analysts). The Project would also include provision for purchase of computer time, housing, and vehicles.

3.26 Finance Division. Additional staff would also be recruited for the Finance Division. These would include 2 Accountants and 1 Procurement and Stores Officer. Three clerks would be upgraded to Senior Clerical Officer. These staff would be provided with office equipment and supplies.

3.27 MANR Planning Unit. The Project will finance for two years the services of an internationally recruited expert to fill the position of Chief of MANR's Planning Unit, and the training of a Malawian national to replace him within that period.

C. Project Cost (Table T-2)

3.28 The total cost of the proposed Project is estimated at MK 11.4 million (US\$12.6 million), of which about US\$5.8 million or 46% represents foreign exchange requirements. Total Project cost is detailed below:

	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>Foreign</u>
	-----MK'000-----			-----US\$'000-----			<u>Exchange</u>
							<u>%</u>
<u>Agricultural Services</u>							
Extension	631	362	993	694	398	1,092	36
Training	247	127	374	272	140	412	34
Research	522	192	714	574	211	785	27
Seed Multiplication	148	626	774	163	687	850	81
Credit Administration	238	93	331	262	102	365	28
Animal Husbandry	237	414	651	261	455	716	64
Sub-total	<u>2,023</u>	<u>1,814</u>	<u>3,837</u>	<u>2,225</u>	<u>1,995</u>	<u>4,220</u>	<u>47</u>
<u>Natural Resources</u>							
Land Husbandry	129	103	232	142	113	255	44
Fisheries	133	75	208	146	83	229	36
Forestry	228	104	332	251	114	365	31
Wildlife	71	52	123	78	57	135	42
Sub-total	<u>561</u>	<u>334</u>	<u>895</u>	<u>617</u>	<u>367</u>	<u>984</u>	<u>37</u>
<u>Hydrology and Water Supply</u>	387	510	897	426	561	987	57
<u>Health Services</u>	217	146	363	239	161	400	40
<u>Technical Services</u>							
Roads	356	669	1,025	392	736	1,128	65
Building Maintenance	388	211	599	427	232	659	35
Mechanical Maintenance	81	46	127	89	51	140	36
Sub-total	<u>827</u>	<u>925</u>	<u>1,752</u>	<u>910</u>	<u>1,018</u>	<u>1,927</u>	<u>53</u>
<u>Administration</u>							
Project Manager's Office	494	447	941	543	492	1,035	47
Evaluation Unit	194	80	274	213	88	301	29
Finance Division	221	83	304	243	91	334	27
Sub-total	<u>909</u>	<u>610</u>	<u>1,519</u>	<u>1,000</u>	<u>671</u>	<u>1,671</u>	<u>40</u>
<u>Base Cost</u>	<u>4,924</u>	<u>4,338</u>	<u>9,262</u>	<u>5,416</u>	<u>4,772</u>	<u>10,188</u>	<u>47</u>
Physical Contingencies	245	218	463	270	240	510	45
Price Contingencies	<u>1,054</u>	<u>664</u>	<u>1,718</u>	<u>1,159</u>	<u>730</u>	<u>1,890</u>	<u>39</u>
<u>Total Project Cost</u>	<u>6,209</u>	<u>5,234</u>	<u>11,443</u>	<u>6,830</u>	<u>5,757</u>	<u>12,588</u>	<u>46</u>

Project costs were evaluated at prices prevailing in April 1978. There are no taxes and duties. A physical contingency of 5% was applied to all costs, this is a weighted average of all activities and will vary by individual component; price contingencies were applied as below:

	<u>Year 1</u> 1978/79	<u>Year 2</u> 1979/80	<u>Year 3</u> 1980/81	<u>Year 4</u> 1981/82
Local Costs	10%	9%	8%	8%
Foreign Costs	7.0%	6.5%	6.0%	6.0%

D. Financing

3.29 The financing of project costs would be shared in the following amounts and proportions:

	<u>US\$ million</u>	<u>% of Total</u>
IDA	10.7	85
Government	<u>1.9</u>	<u>15</u>
Total	12.6	100

The proposed IDA credit would be on standard terms to Government. It would finance the Project's foreign exchange costs (US\$5.8 million) and about 72% (US\$4.9 million) of local costs. It is recommended that any Project related expenditures incurred after the final disbursements for the phase II project (April 1978) and before credit signing, would be eligible for retroactive financing; retroactive financing is expected to total about US\$600,000.

E. Procurement (Table T-11) 1/

3.30 Procurement of vehicles, machinery and equipment (US\$1.6 million) in orders of \$50,000 or over would be subject to international competitive bidding according to IDA guidelines; orders would be bulked whenever possible. Civil works, boreholes, wells, staff housing, and other buildings (US\$1.6 million), which due to their small size and dispersed locations would not attract international competitive bidding, would be constructed after local

---

1/ Amounts are expressed without contingencies.

competitive bidding or by force account. Purchase of office equipment (US\$.016 million) would be subject to local competitive bidding in accordance with existing Government tender procedures; all tenders would be processed by the Malawi Government Central Tender Board, whose procedures are acceptable to IDA. Construction of secondary and district roads would be the responsibility of the SVADP road construction unit during the life of the Project, and by MOW or the District Councils thereafter. Drifts and culverts would be constructed by independent contractors after local competitive bidding or by force account; these works would be supervised by the Ministry of Works. It was agreed at negotiations that the above procurement procedures would be followed.

F. Disbursement (Table T-3 and Chart C-3)

3.31 The proceeds of the credit would be disbursed on the following basis:

- (a) 100% of the foreign costs if directly purchased and 85% of local costs of vehicles and equipment if imported and purchased locally (US\$1.41 million);
- (b) 85% of the total costs of civil works (US\$1.66 million);
- (c) 100% of the foreign costs of internationally recruited personnel (US\$0.28 million);
- (d) 85% of the total of all operating costs and all other personnel costs (US\$4.91 million);
- (e) 100% of the foreign costs and 85% of total costs of consultancies (US\$0.40 million).

An amount of US\$2.04 million would be unallocated. Disbursements against (a), (c), (e) and the contractual portion of (b) would be fully documented. Disbursements against (d) and the force account work of (b) would be made against statements of expenditure certified by the Project Manager and the Financial Controller; the documents for these expenditures would not be submitted for review but would be retained by the Borrower and would be available for inspection by IDA in the course of normal supervision missions. Any funds remaining in the credit account upon completion of the Project would be available for reallocation for financing supplementary Project related expenditures, subject to the approval of IDA.

3.32 As indicated in paragraph 3.03, the Project costs outlined above exclude certain expenditures by the Project entity which are to be considered

as recurrent expenditures and totally financed by the Government. The costs total MK 1.5 million over the Project period. For the purpose of disbursement under item (d) of the preceding paragraph, it was agreed during negotiations that these recurrent costs would be deducted from the Project entity's expenditure on operating costs and other personnel costs before arriving at the base figure to which the 85% disbursement factor would be applied under the following schedule: not less than (A) MK 100,000 in fiscal year 1978/79, (B) MK 438,000 in fiscal year 1979/80, (C) MK 470,000 in fiscal year 1980/81, (D) MK 496,000 in fiscal year 1981/82.

3.33 An estimated schedule of disbursements is given below, and a Project Implementation Schedule is available in Chart C-3.

Estimated Schedule of Disbursements

<u>IBRD</u> <u>Fiscal Year</u>	<u>Quarter</u>	<u>Quarterly</u> <u>Disbursements</u> ----- (US\$ '000) -----	<u>Cumulative</u> <u>Disbursements</u> -----
1978/79	September 30, 1978	-	-
	December 31, 1978	1,000	1,000
	March 31, 1979	2,000	3,000
	June 30, 1979	1,500	4,500
1979/80	September 30, 1979	700	5,200
	December 31, 1979	600	5,800
	March 31, 1980	600	6,400
	June 30, 1980	600	7,000
1980/81	September 30, 1980	600	7,600
	December 31, 1980	500	8,100
	March 31, 1981	500	8,600
	June 30, 1981	500	9,100
1981/82	September 30, 1981	600	9,700
	December 31, 1981	500	10,200
	March 31, 1982	500	10,700

G. Accounts, Audit and Reports

3.34 During the life of the Project, accounts would be maintained at Project Headquarters at Ngabu, with separate accounts identified for credit fund operations. Phase I and II accounts have been audited by the Auditor General, and as this arrangement has proved satisfactory to IDA, this procedure would be followed for the proposed Project. It was agreed during negotiations that accounts would continue to be audited by an independent

auditor satisfactory to IDA and that accounts would be submitted to the Association no later than six months after the close of the financial year. It was also agreed during negotiations that Government would, promptly after completion of the Project but no later than three months after the credit closing date, prepare a completion report on the execution of the Project, its costs and benefits, and its major accomplishments. Under Phases I and II quarterly reports have been regularly submitted and it was agreed that this practice will continue.

#### H. Environmental Effects

3.35 The Natural Resources Division of the Project Unit would be primarily concerned with monitoring the environmental effects of the Project. Regular sampling is being done and checks would be continued on the pesticide content of the Shire River and its major tributaries to monitor any possible effects from the cotton spraying program. The Project would enforce measures to control erosion and river siltation caused by forest cutting and cultivation of the escarpments surrounding the Valley. The forest reserves and game parks in and adjoining the Valley will be maintained. Steps are also being taken in the Project (para. 3.10 (ii)), to stabilize the growth of livestock herds in an effort to prevent overgrazing, another contributing factor to the erosion problem. SVADP related activity has been centered mostly on the Valley floor, and erosion problems that may have developed because of cultivation of the foothills cannot be attributed to the program, but are a result of population pressure on the land. The Project goals of increased yields per hectare on the most suitable land areas would help to reduce the rate of increase in cultivation of the foothills.

#### IV. ORGANIZATION AND MANAGEMENT - (Chart C-1)

4.01 The Project would be a direct continuation of the second phase project, and would be carried out by the existing SVADP staff, supplemented by those staff to be recruited specifically for the third (consolidation) phase. No substantive changes are envisaged in the existing organizational structure (Chart C-1). The Project Manager would continue to be responsible to the Permanent Secretary of the Ministry of Agriculture and Natural Resources (MANR), who would provide overall policy guidance for the program. The Project Manager's office would oversee the four main operational divisions (Agriculture, Natural Resources, Finance, Technical) and the Ancillary Services Division. The health component would be administered by the Ministry of Health. ADMARC would oversee construction of the markets and input stores.

4.02 The Agricultural Division is headed by a Senior Agricultural Officer, who simultaneously is in charge of the Extension section of the Division. In view of the scarcity of qualified nationals this post is likely to continue to be filled by an internationally recruited officer. The same division



is headed at sectional level by a S9 or a Professional officer. The main activities supervised by the Division are: agricultural extension, agricultural research, agricultural credit, livestock, and farmer and staff training. The Natural Resources Division implements and supervises five main activities: land husbandry, forestry, fisheries, hydrology and potable water, and wildlife. The P.O. in charge of the Land Husbandry section would head the Division, and would maintain close liaison with the extension, livestock, and research sections of the Agricultural Division due to the overlapping sphere of interests of both divisions. The Finance Division, under the Project Financial Controller, would maintain constant liaison with the Senior Financial Controller based in Lilongwe to ensure that national policies are being implemented and programs adapted accordingly. Due to the highly complicated nature of the semi-computerized accounting system, the post of Financial Controller would be held by an internationally recruited officer, who would set up a program to train professional staff who can gradually take over control of the Division during the life of the Project. The Technical Division would be headed by a Professional Engineer, who would be in charge of the roads construction and maintenance section and also be responsible for building and maintenance, and mechanical maintenance. The Ancillary Services Division would coordinate Public Health, Community Development and other related activities and provide assistance to the executing officers in carrying out Project development activities.

4.03 The above organization has worked well during Phase I and II. However, there is a need to improve the extension/training/research sections of the organization as described in paras. 3.04, 3.05 and 3.06.

4.04 A number of posts are particularly critical to the success of the project: Project Manager; Senior Agricultural Officer; Senior Research Officer; Senior Veterinary Officer (Tsetse study); Hydrogeologist; Evaluation Officer; and Financial Controller. All are currently adequately filled; however, it was agreed during negotiations that they would continue to be filled by suitably qualified staff and that any replacement would be selected after consultation with IDA.

4.05 At the start of the Phase II project, there were 12 internationally-recruited staff in senior positions; during its course, one was replaced by a Malawian (the senior fisheries officer). The 11 internationally-recruited staff at the beginning of Phase III occupy the 7 positions mentioned in the preceding paragraph, as well as the senior training officer; the chief livestock officer; the senior roads engineer; and the land husbandry officer. There are, in addition, 16 senior grade Malawian staff. It is expected that MANR will continue to assign qualified Malawian staff to the project in order to provide them with the on-the-job-training necessary to qualify them for taking over these 12 positions. During negotiations, it was agreed that the Borrower shall prepare and send to the Association no later than March 31, 1979, a program for the recruitment and training for purposes of the Project of suitably qualified Malawi nationals in numbers

adequate to assume, by the completion of the Project, responsibilities currently being undertaken by internationally recruited staff and, after consultation with the Association, the Borrower shall carry out the program as finally formulated.

## V. PRODUCTION, MARKETS AND PRICES, AND FINANCIAL BENEFITS

### Background

5.01 Improved research, extension, training and land husbandry services would provide the basis for the improvements in traditional methods necessary to develop an increase in major crop yields. The Project extension service was expanded very rapidly at the onset of Phase II, and was staffed at the village level with inexperienced Development Assistants (DA); many of these staff have since qualified for Colby Agricultural Training College, and following completion of their course have returned to the Valley to be assigned as Technical Assistants (TA's) on a permanent basis. Further upgrading of DA staff will continue under the Consolidation Phase. The intensified extension system can only be effective if it has an acceptable package to extend to the Project's smallholders. Although progress in development of improved cereal grain varieties had been slow during the previous two projects, there have recently been good results in identifying maize, sorghum and millet varieties better suited for Valley conditions. A full supply for Valley planting should be available by the second or third year of the Project.

### A. Production (Table T-5)

#### Crop Package and Yields

5.02 Projections of Project crop yields and total production are based upon adoption by smallholders of a basic package of practices designed to reduce the risks of the periodic dry spells which have historically affected Valley production. In addition to improved drought resistant cereal varieties, the package includes pest control measures and moisture conserving land preparation methods. The latter calls for early plowing, ridging and contour planting to take full advantage of the first rains and provide a moisture conserving environment for the balance of the growing season. Specific crop packages have been developed for each of the five ecological zones in the Project area. The crops recommended are traditional for the various regions, and adoption of the basic package (Stage I) would only require farmer's acceptance of a relatively simple change in his present methods and minimal cash inputs. Improved practices would be recommended for all commonly grown crops; however, the individual packages for the five zones (Table T-6) each include one or two major crops representing the bulk of the farmer's planted area, while the other crops listed are usually grown only to supplement the family diet. The package approach would concentrate on the major crops in the unit.

5.03 For cotton, Stage I includes (in addition to the cultivation practices mentioned above) 5 or 6 sprayings and regular weeding and thinning to establish the recommended plant population. Fertilizer is not recommended since trials with fertilizer have shown no appreciable response in Valley soils under rainfed conditions. For the cereal grain and groundnuts, Stage I calls for improved seed and land preparation practices similar to those recommended for cotton. A second level of crop improvement practices (Stage II) is anticipated among more advanced farmers; this would include the use of fertilizer, and additional sprayings. Second stage practices would only be applied in selected locations where soil moisture can be depended upon for fertilizer response. This would be mostly in the higher rainfall escarpment and the dimba areas. (The latter is the local term for the flood plains bordering the Shire and its tributaries where after the wet season, high water recedes and crops can be grown through the dry season on the rich alluvial borders. Maize and rice are the common dimba crops.) Average yields of adopting farmers are expected to increase as follows:

<u>Crops</u>	-----kg/ha-----		
	<u>Traditional Method</u>	<u>Stage I</u>	<u>Stage II</u>
Cotton	350	750	<u>1/</u>
Maize	600	850	1,500
Dimba Maize	1,000	1,800	2,500
Sorghum	450	650	1,200
Millet	450	600	700
Rice (Dimba)	800	1,100	1,600
Groundnuts (unshelled)	400	550	700

1/ Stage II for cotton is not recommended, since the return from the fertilizer and additional spraying is not economically justifiable.

Yield increases have been projected at realistic levels. Experience with production results over the past several years indicates the danger in projecting overly-optimistic returns in the Valley's marginal rainfall environment. Consequently Project yields have been adjusted to allow for a dry year every fourth year which reduces average yields by about 20%. Although adopters of improved practices for cotton in Phase I attained average yields of 1,050 kg/ha, their production declined to an average of 540 kg/ha in 1972/73 because of reduced rainfall. Phase II appraisal projections predicted 1,000 kg/ha average cotton yields for improved farmers, but because of a serious drought and poor price incentive yields dropped as low as 400 kg/ha in 1975/76. Cotton yields recovered in 1976, and were estimated at close to 600 kg/ha in 1976/77, despite an estimated 20-25% loss due to a mice infestation that spoiled the last of the crop. There is only limited information available on cereal grain yields; however, total production figures seem to indicate maize yields have generally followed the same pattern, as unfavorable weather and the lack of suitably adapted seeds caused wide fluctuations in yield. Sorghum yields have been fairly consistent despite the dry years,

although the unavailability of higher yielding varieties has kept overall yields below Valley potential. Project yields have been calculated with an allowance for: (i) the risk of recurring dry seasons and (ii) the probability that the total land available for the expanded project would be on average less potentially productive than the highly productive black cotton soils of the central valley.

#### Seed Production

5.04 The Project would provide for the production and distribution of a guaranteed supply of suitable seed, produced under careful supervision, properly cleaned and treated for disease and pest resistance. Improved drought-resistant varieties of cereal grain (maize, sorghum and millet) seed would be selected and multiplied to meet Project needs at the proposed irrigated seed selection and multiplication farm at Makanga. The maize hybrid SR 52 now most commonly used has proven unsatisfactory in Valley conditions, and several proven low-altitude, drought resistant varieties are being produced under license from Pioneer Seed Company. In addition, a local maize composite, Malahanga, that has yielded over 1,500 kg/ha in rainfed trial plots, is being multiplied by the research staff who - with careful selection and crosses to several CYMMIT composites - are developing a hardy locally adapted composite to supplement the Pioneer hybrids. The commonly used white sorghum varieties would be replaced by the higher yielding disease resistant Lindsey 555 and Thengalamanga, both of which have been thoroughly tested in typical Valley conditions. Eleven trial plots of one acre each yielded an average of 1840 kg/ha of Lindsey 555 and 18 similar plots of Thengalamanga yielded 1960 kg/ha; neither sets of trials using fertilizer. Work on breeding improved varieties of cotton will be carried on at the MANR Station at Kasinthula where soils are ideally suited for cotton production. Multiplication and distribution of the new cotton varieties would follow widespread experimental plantings to fully test all aspects of the seed; no project benefits have been assumed from these hoped for future cotton improvements. Production of seed for sale to Project smallholders is projected to reach 225 m tons of maize, 225 m tons of sorghum, 70 m tons of millet, 62 m tons of groundnuts, 44 m tons of guar beans and 75 tons of edible beans in 1981/82 (Year 4). Seed production at Makanga will be coordinated with seed production on government seed farms in the highland regions with seed varieties to be adapted for sea level production being produced at Makanga while varieties for higher elevations will be produced outside the Valley.

#### Crop Production (Table T-5)

5.05 At full development, incremental production of major field crops would be derived primarily from increased yields, as the total areas planted would remain fairly constant. As detailed in Table T-5, the area in improved practices is projected to increase from 11,000 ha to 50,000 ha. Table T-7 provides a summary of commodity budgets for the major crops and identifies the yields and the resulting gross margins of unimproved and improved practices, by full development. On these assumptions, the Project's incremental production would be as below:

Incremental Production, 1982/83 (Year 5)

<u>Crop</u>	<u>Stage I</u>	<u>Stage II</u>	m tons
	-----ha-----		
Cotton	3,300	-	4,320
Maize	12,500	2,700	5,555
Dimba Maize	1,350	1,080	2,700
Sorghum	5,300	900	1,600
Millet	4,500	900	900
Dimba Rice	1,500	450	2,800
Groundnuts	720	-	153
Guar Beans	1,800	-	1,620
Leuceana	450	-	2,700

Livestock Production and Fisheries

5.06 With the improvements in extension support, marketing facilities and control of FMD and trypanosomiasis under the Project, and with the growing demand for young feeder cattle, cattle sales are expected to increase steadily. Annual offtake should increase from the present 9% (5,400 head) to 12% (8,800 head) at full development (year 6). Without the Project, uncontrolled herd growth could lead to serious feed shortages and consequently higher mortality and lower reproductive rates; the absence of FMD control, the increasing threat of tsetse, and poor extension and veterinary services would add a further constraint to increased sales. With the Project, incremental sales would total approximately 550 tons of beef per annum. With continued Project support for training 1,200 fishermen, and establishing modern smoking kilns and added boat landings production should increase by 2,700 tons per annum (see Table T-8).

B. Markets and Prices

5.07 There is sufficient demand for all Project output of food and cash crops, meat and fish, within the Valley and in adjacent regions. Cotton produced in the Shire Valley is a strong medium-to-long staple; the lint is classified at higher grades and is in strong demand on both the foreign and domestic markets. It consistently brings about a 10% premium over similar grades on the world market because of its superior quality. Cotton seed oils are used domestically to substitute for imported vegetable oils and the cake is used in livestock feeds. The Valley is a deficit area for cereal grains and local demand usually forces prices up well over Government announced sale prices. It is expected that the increased production from the improved maize and sorghum varieties to be introduced by the Project would reduce the deficit and provide an improved diet for the Valley population. Rice and groundnut production is relatively low in total tonnage, but with attractive world market prices, production should increase to the maximum possible on the available suitable land. Meat sales, when not barred by FMD,

have been steady with good demand by buyers from outside the Valley who purchase both slaughter and feeder stock. Sales of smoked fish from modern kilns have also been strong, with a steady demand by traders from the area surrounding the Valley.

### Crops

5.08 ADMARC (para 1.08) maintains a well established network of 43 markets in the Shire Valley, which are controlled from the Divisional Office at Ngabu. This represents an average of one market per 1,500 farm families, and it is estimated that over 90% of growers live within three miles of a market. Each year, before start of the growing season, ADMARC recommends and the Government determines guaranteed minimum prices for all crops to be purchased. Prices are fixed countrywide with the twofold objective of insuring a reasonable return to the farmer and earning surpluses to support national development programs. ADMARC justifies its approach to price setting on the grounds of holding down domestic inflationary factors. In the case of cotton, this policy has proved a disincentive to increased production; Shire Valley cotton plantings have declined from 29,000 ha in 1973/74 to 20,000 ha in 1976/77, although yields (except for the severe drought years) have remained relatively stable. ADMARC announced a 17% price increase for seed cotton just prior to the 1977/78 planting season, and recent information from the field indicates an increase in plantings. Farmgate prices for cotton in 1977 were 23 tambala (t)/kg for Grade A, 18.0 t/kg for Grade B, and 13.0 t/kg for Grade C. A 3.3 t/kg increase for all grades was announced for the 1977/78 crop season, which will average out to about 24 t/kg for the three grades. This was the largest single seasonal advance in the past ten years. This increase served to somewhat lessen the gap between the Grade C price and the average of the A and B prices; it is now about 67% of the average farmgate price (the composite price of all three grades). In previous years, the relatively lower price for Grade C made it often less than economically feasible to provide the labor for the last cotton picking (which usually grades low). The new prices should provide an incentive to farmers to pick their fields clean. Prices for the major food crops, maize, sorghum and millet are also set by ADMARC; however, since the Valley is a deficit food grain area, smallholders with a surplus over family needs trade freely on local markets for the best price obtainable. The price used in calculating financial benefits for maize, MK 82/m ton, which is the price a farmer must pay when he purchases maize for his family's food and other cereal grains are priced accordingly.

### Livestock

5.09 Livestock are marketed at the public sales installations located in centers of livestock concentrations; six such markets with weighing platforms, water supplies and buildings for attendants were constructed in Phase II, and the Project would finance a seventh. Sales are conducted at regular intervals and are supervised by the Veterinary Department of MANR. Except when FMD forced cancellation of sales, the auction markets have functioned effectively, and demand has always been high for Valley animals because of their size and generally good body condition. The CSC, and local and Blantyre

butchers all participate in the auctions; given this competition, livestock owners generally obtain a fair price for their animals. FMD recurrences, however, remain a risk although the Project's valley-wide vaccination program should reduce the probability of frequent outbreaks. Prices at the sales are calculated on actual liveweight of the animal before it enters the auction ring; they range from MKO.06/kg to MKO.07/kg, well over the announced floor prices of MKO.05/kg for commercial grade and MKO.4/kg for standard grade.

### Fish

5.10 Seventy percent of the annual fish catch is consumed locally; the balance is sold to traders from areas outside the Valley. With the use of the modern fish smoking kilns, the demand and the value of the traditional catch has improved dramatically. Smoked fish are now bringing MKO.24/kg; previously most fishermen sold their fish unsmoked at MKO.07/kg, while a small percentage smoked by the traditional method brought about MKO.20/kg.

### C. Farmer Benefits

5.11 The project would provide direct and/or indirect services for just about all the 70,000 families in the project area. Some 55 percent of these or about 40,000 farm families are expected to benefit directly from the project's increased and intensified extension and training system, and by applying the improved packages would receive the benefits of increased production. Typical farm production units were estimated on the basis of crop combinations best suited for each ecological zone in the Project area; these were then used to calculate incremental Project production as a result of the Project. Farm budgets for each of the zones are shown in Table T-6. The following is a farm budget for a smallholder unit in the Tomali and Makande Plain, the most intensive cotton producing zone:

<u>Production</u>	<u>Planted Area (ha)</u>	<u>Production (kg)</u>		<u>Gross Value (MK)</u>	
		<u>Unimproved</u>	<u>Improved (Stage-I)</u>	<u>Unimproved</u>	<u>Improved (Stage-I)</u>
Cotton	0.84	290	630	69.60	151.20
Rainfed Maize	0.43	260	370	21.32	30.34
Dimba Rice	0.08	80	140	6.56	11.43
White Sorghum	0.30	140	200	10.92	15.60
Millet	0.20	90	120	5.90	9.20
Groundnuts	0.01	-	10	-	-
Total	1.94	920	1,550	114.30	217.77

<u>Production Costs</u>	<u>Unimproved</u>	<u>Improved</u>
	-----MK-----	
Seed	2.70	3.20
Insecticides <u>1/</u>	-	23.80
Fertilizer	-	2.70
Other Materials <u>2/</u>	<u>2.90</u>	<u>6.70</u>
Sub-total	5.60	36.40
<u>Net Farm Benefit</u>	108.70	181.37
Total Mandays	190	230
Return Per Manday	<u>0.57</u>	<u>0.79</u>

1/ Includes 15% credit charge.

2/ Such as tools, baskets, transportation, sprayer costs, etc.

The unit shows an increase in subsistence and cash crop income of MK73 over the "without project" situation; this represents a 66% increase in net return and an increase of MK0.22 per manday of labor for all days worked--the marginal return per manday is MK 1.80. The farm units in the five ecological zones would increase the net value of crops with the Project as follows:

<u>No. of Farms</u>	<u>Zones</u>	<u>Net Income (MK)</u>		<u>Increment</u>	
		<u>Unimproved</u>	<u>Improved</u>	<u>MK</u>	<u>%</u>
7,000	Mwanza and Nsanje Hills	58	85	27	47
5,000	Mwanza Valley	97	153	56	58
25,000	Tamali and Makande Plain	109	181	73	67
15,000	East Bank	53	90	37	70
17,000	Tengani and Nsanje Plain	54	75	21	72
	Overall average	74	117	43	58

Smallholders not presently using improved practices but adopting them by full development could increase an individual family's subsistence and cash annual income by about US\$47. Intermediate increases in income will be achieved by farmers already adopting some of the improved practices and by those who do not apply all of the practices to all their planting.

#### D. Government Cash Flow (Table T-9)

5.12 Government would not be able to recover fully the on-going expenditure under this Project. After Project completion and excluding debt service



and price contingencies, the annual cost to Government to maintain the level of extension and other services would total MKO.527 million; there would be a total cumulative deficit of MK8.99 million (US\$9.88 million), by year 20. In the Government cash flow, ADMARC profits are assumed to be benefits to the Government, and have been calculated on the basis of actual average profit on cotton purchases of the last five years, i.e. 57% of purchase price. It is assumed that the Credit Fund Surplus would be transferred to the Government budget after the Project. Possible farmers' contribution to Government revenue through indirect taxes resulting from increased income are expected to be insignificant and have not been taken into account. This unsatisfactory cash flow is not unexpected since the Valley smallholder agriculture operates close to subsistence level and most of the increased production will go to meeting the present food deficit. The issue of cost recovery and Malawi's capacity to sustain projects with extensive service components goes beyond the Consolidation Project and is to be addressed on a national basis in the context of the proposed National Rural Development Program, which is currently under appraisal. There was agreement at negotiations that any policies on cost recovery which may be developed under NRDP, would apply also to the Shire Consolidation Project.

5.13 During negotiations it was acknowledged by the Malawian delegation that Government was concerned with the cost recovery problem but because of the political sensitivity of assessing charges for services that traditionally have been almost entirely free it was approaching the issue on a selective basis. Specifically under the Shire Consolidation, services to the livestock sector, the fisheries industry, and wildlife development would be evaluated with the objective of obtaining an equitable return for services rendered or to establish them on a completely self-sustaining basis. The fisheries development and modernization program has been successful and both fishermen and buyers are taking over construction and maintenance of kilns. The Consolidation Phase input will be sufficient to bring the remaining undeveloped marsh areas into the marketing sphere and should be the final direct Government financed expenditure for fisheries development. With the improvement and expansion of the chalets at the Lengwe Game Park, there will be enough accommodations to provide for operation of the Park at a break even if not at a profitable level. Increasing charges for the various livestock services presents a more difficult problem since Government has attempted to hold cattle prices at levels well below export parity levels. Under this price constraint livestock owners are providing an indirect consumer subsidy and should not be expected to further reduce their margin by paying for present services. In fact, increasing dip, vaccination and other similar charges would probably discourage herders from using these facilities with the result that the national herd health program could suffer a serious setback.

## VI. ECONOMIC BENEFITS AND JUSTIFICATION - (Table T-10)

6.01 At full development (1982/83), annual incremental crop production attributable to the Project would be valued at about \$1.50 million; cattle

sales and herd values would increase by about \$0.33 million, and the value of incremental fish production would reach \$0.22 million. Seed cotton, the cereal grains, groundnuts, guar beans, and leuceana have been valued at export parity prices; brewing sorghum, until now an imported commodity, has been valued at its import parity price. Local market prices have been applied to locally-smoked fish and beef, 1/ mostly consumed in the Valley and surrounding regions. IBRD commodity price forecasts have been used for rice, groundnut, beef, and the cereal grains to estimate future real price changes.

6.02 In addition to the quantifiable benefits, the population of the valley would benefit from improved potable water supplies, health facilities, roads, and firewood supply. The Project would promote future irrigation development through the financing of an irrigation feasibility study.

6.03 The overall economic rate of return (ERR) of the Project over 20 years would be 20% (Table T-10). In the economic analysis, Project and incremental farmers' costs were included to the extent they contribute to development of the quantifiable benefits. Total costs of the extension, training, seed multiplication, credit administration, land husbandry and fisheries components have been included. The livestock component costs do not include the cost of Foot and Mouth Disease Control since the program is part of a nationwide animal health program, the benefits of which cannot be clearly localized. Some 80% of research costs have been included as these are attributable to activities with a direct impact on present crop and livestock production; while at least 20% represents an investment for future Valley development. Two thirds of forestry costs have been included, as these are estimated to have an impact on agricultural production by reducing erosion and preventing excessive siltation; the balance of the forestry costs are excluded as they are directed towards fuelwood production on an experimental scale, the benefits of which cannot yet be quantified. Half of the costs of the hydrology and water supply component have been included as they are related to agricultural production, since the village boreholes are used to supply water for crop spraying and livestock; the other half of the costs are directed towards potable water supply for human consumption. The cost of the irrigation studies are excluded. Some 80% of the road construction and maintenance costs have been included in the economic analysis because they directly support the development of agriculture, livestock and fisheries; the remainder have been attributed to roads for public use, the benefits of which have not been quantified. Costs of buildings and mechanical maintenance and of administrative services (management, evaluation and finance components) have been included at 90% of their financial costs, since the remaining 10% covers overhead costs which are used in administering the non quantifiable aspects of the project. Costs and benefits of the wildlife and health components have been excluded totally from the economic analysis. Additional economic costs of MK15,000 per internationally recruited staff member have been included to reflect costs borne by bilateral donor agencies. All economic costs and benefits are expressed in constant 1976/77 MK.

---

1/ If beef were valued at import parity prices---and a rational argument could be made for such valuation---project economic returns would be higher than have been presented in this analysis.

6.04 The rate of return of the livestock component with 15% of the economic overhead costs of the Project added, would be 18%. Similarly, the fisheries component, with 5% of the economic overhead charges, would show an ERR of 44%.

6.05 As noted in the review of the earlier Phase II project (paragraph 2.14), the Consolidation Phase III economic and benefits costs have taken as their starting point the current level of benefits achieved under Phase II, and the costs needed to maintain them. It could be argued that some of the benefits attributable to the Consolidation Phase are possible only because of the previous work done under Phase II and that therefore some of the costs and benefits assumed in this analysis as belonging to the Consolidation Phase should be transferred to the Phase II analysis. If this were so -- and it is extremely difficult to make a judgement on this matter -- the economic rate of return on the Consolidation Phase would be somewhat less than the 20% estimated above. (The combined rate of return for Phase II and the Consolidation Phase taken together is 8-10%).

#### Sensitivity

6.06 The ERR would drop to 17% if yields "with Project" were reduced to only 25% increase over the "without Project" case from the 40% projected for some crops in the appraisal. A 25% across the board reduction in all benefits would yield a 12% rate of return. A 10% increase in the adoption rate would result in a 25% rate of return, and shadow pricing unskilled labor for cotton picking would reduce the ERR by 2%. 1/

#### Labor Generated and Income Distribution

6.07 In crop production alone, the Project would increase productive employment by 22%, equivalent to an additional 2.0 million mandays about 7,500 permanent unskilled laborers. Except for a short period during peak seasonal cotton harvest, these requirements could be met through the population increase and a lowering of disguised under-employment. Alternative labor opportunities in the Valley have declined since the middle years of Phase II due to the completion of the main highway and most SVADP civil works, and to the suspension of recruitment for South African work. The labor needs of the Sucoma Sugar Estate also seem to have stabilized. The project is expected to increase the per capita income of about 40,000 smallholder families (para 5.11) and provide important social benefits to about 70,000 families; even so the resultant per capita income in the most productive part of the project area would only reach some \$40 compared to the current national average of some \$130.

---

1/ On-farm labor has generally been priced at near zero since there is generally no labor constraint; however, there are occasional labor shortages during the cotton harvest and a shadow price (amounting to local wage rates) could justifiably be applied, thus raising the economic costs and reducing the ERR.

## Risks

6.08 The following risks could affect the projected benefits calculated for the Project. (i) The technical packages. Although the new drought resistant cereal varieties have been widely tested in trial plots throughout the Valley, they have been grown under farmer's actual conditions in only a limited area and only widespread use under varying weather conditions can furnish a true test. (ii) Exceptional drought. As noted in para 5.03 yield projections (and therefore project benefits) already allow for droughts occurring once in four or five years. However, no allowance has been made for two consecutive dry years encountered exceptionally in Phase II. (iii) The Extension Training and Visit System will have adequate staff and will be started under a well organized Project management team, however, the system is new to Malawi and the Valley and will require at least a full season in the field to be effectively operational. (iv) The possible recurrence of FMD remains a threat to livestock sales, however, the vaccination program for all Valley cattle is expected to lower the risk of recurrence.

## VII. ASSURANCES AND RECOMMENDATIONS

7.01 During negotiations it was agreed that:

- (a) sufficient new TA positions would be established to meet project needs, as follows: 97 positions by May 1 1979; 112 by May 1980; and 132 by May 1981; (para 3.05);
- (b) the Ministry of Works would assume responsibility for maintaining of Project constructed main and secondary roads; Ministry of Works or district councils would be responsible for district roads at project completion (para 3.22);
- (c) current costs necessary to maintain services for farmers and fishermen who have achieved Phase II Project goals be met by Government's revenue budget as presented in para 3.32;
- (d) any replacement of certain staff be made after consultation with IDA (para 4.04), and the Government will, in consultation with the Association, prepare a program for the training of Malawians to replace all the expatriates in the SVADP management team by 1982 (para 4.05); and
- (e) any policies on cost recovery which may be developed under NRDP would apply also to the Shire Consolidation Project (paras 5.12, 5.13).

7.02 It is a condition of the use of funds for the Shire irrigation study that Government would have initiated an overall national irrigation study on terms and conditions and with consultants satisfactory to IDA. The terms of

reference and consultants to be used for the Shire study would be agreed with IDA (para.3.19).

7.03 It is a condition of credit effectiveness that about 150 ha of the Makanga Research Station has been transferred to Project control and administration to be used for seed selection and multiplication (para 3.08).

7.04 It is a condition of disbursement for financing additional boreholes that Government prepare a program to involve villagers in regular borehole and well surrounds maintenance (para. 3.20), satisfactory to IDA with agreement that it be implemented under the Project.

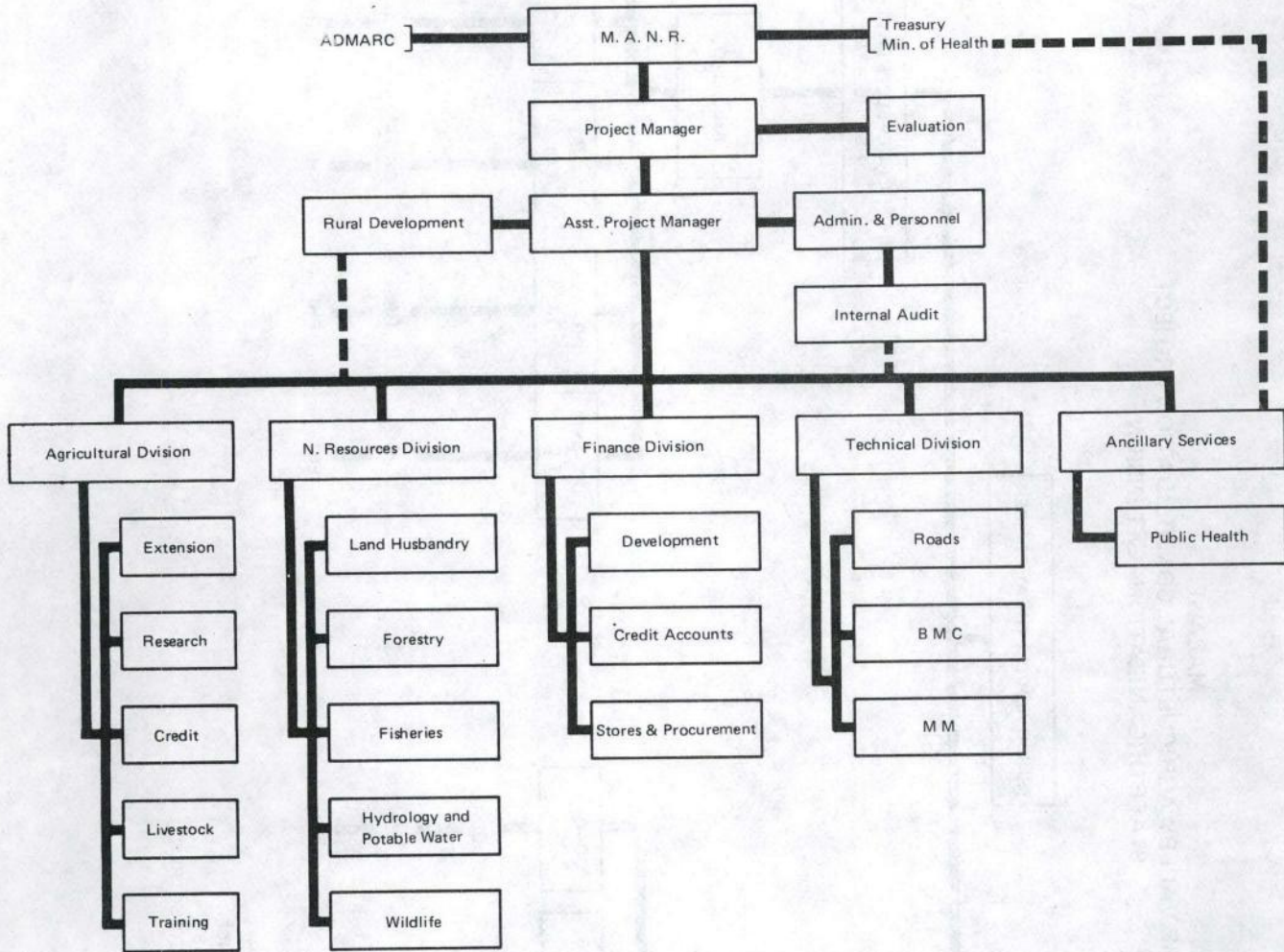
7.05 With these assurances and conditions, the proposed Project is suitable for an IDA credit of US\$10.7 million to the Government of Malawi.

MALAWI

Shire Valley Agricultural Consolidation Project

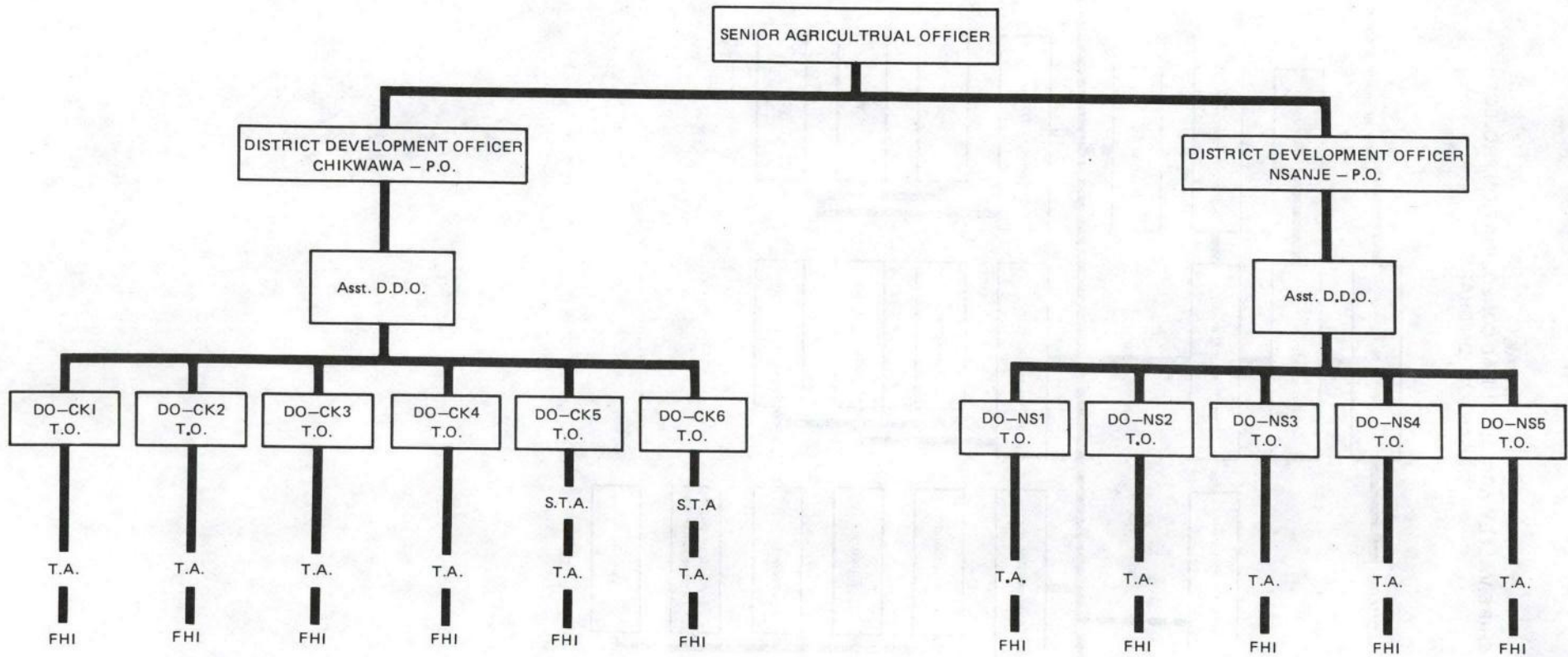
Supporting Charts and Tables

### MALAWI SHIRE VALLEY AGRICULTURAL CONSOLIDATION PROJECT ORGANIZATION CHART



MALAWI  
SHIRE VALLEY AGRICULTURAL CONSOLIDATION PROJECT  
STAFF ORGANIZATION-EXTENSION

Chart - C-2



KEY:

P.O. PROFESSIONAL OFFICER	NS NSANJE DISTRICT
DDO. DISTRICT DEVELOPMENT OFFICER	T.O. TECHNICAL OFFICER
D.O. DEVELOPMENT OFFICER	T.A. TECHNICAL ASSIST.
C.K. CHIKWAWA DISTRICT	FHI FARM, HOME INSTRUCTRESS



MALAWI  
SHIRE VALLEY AGRICULTURAL CONSOLIDATION PROJECT  
PROJECT IMPLEMENTATION SCHEDULE

Chart C-3

CALENDAR YEAR QUARTER	1978		1979				1980				1981				1982	
	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2
<b>STAFF RECRUITMENT AND PROMOTIONS</b>																
CTO and Above	7		3													
STA to STO	3	4	3	4	3		1									
DA to TA and Added TA's	40	20	20	17	5	5	5	5	5	5	5					
<b>STAFF HOUSING CONSTRUCTION</b>																
DL-3	2	2	2	1	1		1				1					
EL-2A		4	4	1		2		1								
EL-2	8	10	10	10	7		5	5	2	2	2	1	2	2	1	
PL Conversions	5	5	5	5	4	4	4	3	4	4	4	3	5	5	5	
Low Cost		5	5	5	2	2	1	-	2	1	2	1	1	1		
<b>RURAL TRAINING CENTERS</b>																
District Centers		1	1	1		1	1									
Village Centers		2	3	2	3	3	3	3	5	5	5	5	5	5	1	
<b>FISH LANDING SITES</b>			1				1				1			1		
<b>CONSTRUCTION OF STORES AND OFFICES</b>																
Laboratories and Stores		1	1	2												
Office Buildings			1	1	2	1	1									
<b>CONSTRUCTION OF HEALTH CENTERS</b>																
Sub-Centers			1	1			1	1								
Health Posts	1			1			1									
<b>CONSTRUCTION OF BOREHOLES AND WELLS</b>																
Boreholes		5		5		5		5		5		5		5		5
Shallowells			5		5		5		5		5		5		5	
<b>ROAD CONSTRUCTION</b>																
Standard I		58 KMS:														
Standard II								35 KMS								
Standard III									46 KMS							
<b>MAKANGA IRRIGATION SYSTEM</b>																
Flood Bund																
Site Clearance																
Access Roads																
Pumping Station																
Pipelines, Canals and Drains																
Electric Power Line																
<b>PROCUREMENT</b>																
4-Wheel Drive Vehicles				17				8				2				
Pick Up Trucks			4							1		1				
Tractors and Equipment					6			2				2				
Trucks					5			2								
Motorcycles					60			13				3				17
Vans and Equipment					2				2			1				
Miscellaneous Equipment																
Well-Driller								1								
Heavy Road Equipment (Assorted)				5				1		1						

## MALAWI

## SHIRE VALLEY AGRICULTURAL CONSOLIDATION PROJECT

	Credit Fund Cash Flow (MK)					
	1976/77	1977/78	Year 1 1978/79	Year 2 1979/80	Year 3 1980/81	Year 4 1981/82
Unspent Balance Brought Forward	1,795	1,631	1,177	1,202	1,063	845
<u>Withdrawal of Funds - 1/</u>		458				
<u>Inflow</u>						
Recovery Outstanding Seasonal Loans 2/	57	57	57	-	-	-
Loan Repayments						
Seasonal Loans (Principal plus cont. Less 20% bad debts)	-	138	169	185	245	341
Medium Term Loans (Principal plus contingencies less 5% bad debts)	49	86	127	115	137	178
Credit Charges(Interest)						
Seasonal Loans 15% on unpaid principal plus contingencies)	-	21	25	28	37	51
Medium Term Loans (10% on unpaid balance including contingencies less 5% bad debts)	16	22	23	25	31	40
Total Inflow	122	324	410	353	450	610
<u>Outflow</u>						
Utilization of Funds for - Seasonal Loans	165	186	190	234	304	366
Medium Term Loans	108	94	113	133	162	189
Contingencies						
Physical 5%						
Seasonal Loans	8	9	10	12	15	18
Medium Term Loans	5	5	6	7	8	9
Price						
Seasonal Loans 3/	-	16	32	61	1071	165
Medium Term Loans 4/	--	10	25	45	72	107
Total Outflow	286	320	376	492	668	854
Total Balance	<u>1,631</u>	<u>1,177</u>	<u>1,202</u>	<u>1,063</u>	<u>845</u>	<u>601</u>

1/ Reallocation of Funds for: (a) aerial survey and improvement of Mvampanzi bridge on the East Bank MK 208,000  
(b) rehabilitation of irrigation system of Kasinthula Research Station MK 250,000  
MK 458,000

2/ 1975/76 Debtors' Seasonal Loans (MK 254,000) less provision for doubtful debts (MK 40,000) are assumed to be recovered at 80% within the following 3 years.

3/ Since seasonal loans are mostly for imported items, IBRD Guidelines on Expected Price Increase of Foreign Costs (January 1977) has been used; Price Contingency against base year (1976/77): 1977/78 8%; 1978/79: 16.1%; 1979/80: 24.8%; 1980/81: 33.5%; 1981/82: 42.9%.

4/ Since the medium term loans are mostly for locally produced items, IBRD Forecasts for Price Escalation of local costs in Malawi have been used for projection: Price Contingency against base year (1976/77): 1977/78: 10%; 1978/79: 21%; 1979/80: 31.9%; 1980/81: 42.4%; 1981/82: 53.8%.

March 16, 1978

## MALAWI

## SHIRE VALLEY AGRICULTURAL CONSOLIDATION PROJECT

Summary of Project Cost  
(MK)

Component	Year 1 (1978/79)	Year 2 (1979/80)	Year 3 (1980/81)	Year 4 (1981/82)	Total	Foreign %	Exchange Total
<b>Agricultural Services</b>							
Extension	294,910	269,210	230,440	198,440	993,000	36	362,263
Training	105,740	116,690	76,090	75,190	373,710	34	126,686
Research	306,500	139,940	140,520	127,420	714,380	27	192,128
Seed Multiplication	756,595	66,325	(24,350)	(24,940)	773,630	81	625,454
Credit	126,060	68,310	68,310	68,310	330,990	28	93,150
Animal Husbandry	<u>328,360</u>	<u>148,320</u>	<u>93,240</u>	<u>80,900</u>	<u>650,820</u>	<u>64</u>	<u>414,010</u>
Sub-Total	1,918,165	808,795	584,250	525,320	3,836,530	47	1,813,691
<b>Natural Resources</b>							
Land Husbandry	103,840	42,920	43,420	42,100	232,280	44	103,120
Fisheries	71,040	47,050	44,930	44,710	207,730	36	75,035
Forestry	106,130	69,860	103,320	53,010	332,320	31	103,460
Wildlife	<u>54,490</u>	<u>46,590</u>	<u>11,990</u>	<u>9,990</u>	<u>123,060</u>	<u>42</u>	<u>51,680</u>
Sub-Total	335,500	206,420	203,660	149,810	895,390	37	333,295
Hydrology/Water Supply	287,550	237,010	286,110	86,110	896,780	57	509,978
Health	123,185	166,770	36,670	35,870	362,495	40	145,549
<b>Technical Services</b>							
Roads	398,060	296,460	215,210	115,760	1,025,490	65	668,791
Buildings	233,210	127,810	118,810	118,810	598,640	35	210,500
Mechanical Maintenance	<u>54,670</u>	<u>25,120</u>	<u>23,820</u>	<u>23,820</u>	<u>127,430</u>	<u>36</u>	<u>45,615</u>
Sub-Total	685,940	449,390	357,840	258,390	1,751,560	53	924,906
<b>Administration</b>							
Management	282,860	250,060	219,560	188,060	940,540	47	447,410
Evaluation	88,020	68,460	62,200	55,560	274,240	29	80,310
Finance	<u>96,350</u>	<u>66,550</u>	<u>70,840</u>	<u>70,230</u>	<u>303,970</u>	<u>27</u>	<u>83,110</u>
Sub-Total	467,230	385,070	352,600	313,850	1,518,750	40	610,830
Total Base Cost	<u>3,817,570</u>	<u>2,253,455</u>	<u>1,821,130</u>	<u>1,369,350</u>	<u>9,261,505</u>	<u>47</u>	<u>4,338,249</u>

	Year 1(1978/79)			Year 2 (1979/80)			Year 3(1980/81)			Year 4(1981/82)			Total		
	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total
Base Cost	2,024	1,794	3,818	1,195	1,059	2,254	965	856	1,821	726	643	1,369	4,910	4,352	9,262
Physical Contingency	101	90	191	60	53	113	48	43	91	36	32	68	245	218	463
Sub-Total	2,125	1,884	4,009	1,255	1,112	2,367	1,013	899	1,912	726	675	1,437	5,155	4,570	9,725
Price Increase	213	132	345	238	156	394	299	187	486	304	189	493	1,054	664	1,718
Total Project Cost	2,338	2,016	4,354	1,493	1,268	2,761	1,312	1,086	2,398	1,066	864	1,930	6,209	5,234	11,443

- Assumptions:
- Physical contingency: 5% of all Project Components.
  - Price increase of local costs: Year 1: 10%; Year 2: 9%; Year 3: 8%; Year 4: 8% (Compounded: 10.0%; 19.9%; 29.5%; 39.9%).
  - Price increase of foreign costs: Year 1: 7.0%; Year 2: 6.5%; Year 3: 6.0%; Year 4: 6% (Compounded: 7.0%; 14.0%; 20.8%; 28%).

May 10, 1978

MALAWIShire Valley Agricultural Consolidation ProjectWithdrawal of Proceeds of the Credit  
(US\$)

<u>Category</u>	<u>(1)</u>	<u>(2)</u>	<u>(3)</u>	<u>(4)</u>		<u>(5)</u>	<u>(6)</u>	<u>Total</u>
	<u>Vehicles Machinery Equipment</u>	<u>Civil Works</u>	<u>ADS Personnel</u>	<u>Salaries and Allowances</u>	<u>Vehicles Machinery Operation Costs</u>	<u>Consultants Services</u>	<u>Unallocated</u>	
Total Project Costs	1,948,281	1,657,953	330,000	3,146,209	2,630,375	475,200	2,399,100	12,587,118
IDA Share of Costs (rounded)	1,660,000	1,410,000	280,000	4,910,000		400,000	2,040,000	10,700,000

MALAWI  
Shire Valley Agricultural Consolidation Project  
Breakdown of Project Costs into Categories  
(MK)

Project Component	Category	(1)	(2)	(3)	(4)		(5)	(6)	Total
		Vehicles Machinery Equipment	Civil Works	ADS Personnel	Operating Salaries and Allowance	Costs Machinery Equipment Vehicles	Consultants Services	Unallocated	
Extension		155,300	325,000	---	802,840	252,420	---	---	1,535,560
Training		35,800	43,550	---	166,760	127,600	---	---	373,710
Research		64,580	173,000	---	352,220	124,580	---	---	714,380
Seed Multiplication <u>1/</u>		396,150	340,750	---	36,730	---	---	---	773,630
Credit Administration		30,250	27,500	---	186,520	86,720	---	---	330,990
Animal Husbandry		79,550	88,500	---	173,400	309,400	---	---	650,850
Land Husbandry		36,900	32,500	---	93,040	69,840	---	---	232,280
Fisheries		34,950	63,000	---	79,430	49,750	---	---	227,130
Forestry		46,000	131,750	---	84,790	69,780	---	---	332,320
Wildlife		20,100	71,000	---	---	31,960	---	---	123,060
Hydrology/Water Supply		189,400	104,000	---	43,020	128,360	432,000	---	896,780
Health		41,400	192,115	---	18,000	110,980	---	---	362,495
Road Construction & Maintenance		175,600	89,000	---	232,200	626,690	---	---	1,123,490
Building Maintenance		98,400	35,000	---	243,080	284,160	---	---	660,640
Mechanical Maintenance		27,150	17,000	---	136,760	70,560	---	---	251,470
Management		31,300	---	300,000	462,080	333,600	---	---	1,126,980
Evaluation		20,400	37,500	---	144,100	72,240	---	---	274,240
Finance		24,000	---	---	302,040	98,970	---	---	425,010
Contingencies		---	---	---	---	---	---	2,181,000	2,181,000
Sub-total		1,507,230	1,771,165	300,000	3,557,010	2,847,610	432,000	2,181,000	12,596,015
<u>Less Recurrent Costs</u>									
Extension		---	---	---	390,260	152,000	---	---	542,260
Fisheries		---	---	---	9,000	10,400	---	---	19,400
Road Maintenance		---	---	---	28,000	70,000	---	---	98,000
Building Maintenance		---	---	---	25,000	37,000	---	---	62,000
Mechanical Maintenance		---	---	---	79,240	44,800	---	---	124,040
Management		---	---	---	75,600	110,840	---	---	186,440
Finance		---	---	---	89,720	31,320	---	---	121,040
Sub-total		---	---	---	696,820	456,360	---	---	1,153,180
Total Project Costs		<u>1,507,230</u>	<u>1,771,165</u>	<u>300,000</u>	<u>2,860,190</u>	<u>2,391,250</u>	<u>432,000</u>	<u>2,181,000</u>	<u>11,442,835</u>

1/ Operating costs of seed farm has been reduced by revenues from seed sales. Operation is self-sustaining from year three.

May 10, 1978

## MALAWI

## SHIRE VALLEY AGRICULTURAL CONSOLIDATION PROJECT

## Incremental Project Production

PROJECT YEAR	Total Production With Project						Incremental Production					Percent Increase With Project	
	77/78	78/79	79/80	80/81	81/82	82/83	78/79	79/80	80/81	81/82	82/83		
Cotton (m Tons)	11,175	11,395	11,975	12,640	12,865	13,090	80	520	1,080	1,200	1,320	11%	
Cotton Net Return (MK 000)	17,480	1,782	1,873	1,977	2,012	2,047	13	81	169	188	207		
Incremental Labor (Mandays 000)							17	115	238	260	291		
Maize (m Tons)	25,800	26,166	27,290	29,105	31,960	35,105	216	1,100	2,675	5,310	8,255	31%	
Maize Net Return (MK 000)	2,013	2,037	2,107	2,223	2,401	2,591	16	81	197	392	610		
Incremental Labor (Mandays 000)							20	104	250	495	772		
Dimba Rice (m Tons)	800	1,230	1,750	2,600	3,600	4,900	270	575	1,210	1,860	2,800	133%	
Dimba Rice Net Return (MK 000)	67	103	147	218	302	412	23	48	102	156	235		
Incremental Labor (Mandays 000)							42	89	185	284	431		
White Sorghum (m Tons)	6,380	6,638	6,939	7,628	8,316	8,955	38	140	628	1,116	1,555	21%	
White Sorghum Net Return (MK 000)	460	478	500	549	599	645	3	20	45	80	112		
Incremental Labor (Mandays 000)							5	17	80	140	198		
Millet (m Tons)	6,120	6,300	6,355	6,548	6,885	7,200	-	55	250	585	900	14%	
Millet Net Return (MK 000)	386	397	400	416	434	454	-	3	16	37	57		
Incremental Labor (Mandays 000)							-	5	25	55	91		
Groundnuts (Unshelled) (m Tons)	860	830	854	881	917	953	-	54	81	117	153	18%	
Groundnuts Net Return (MK 000)	32	68	67	68	68	67	-	4.3	6.3	9	11		
Incremental Labor (Mandays 000)							-	15	23	30	42		
Brewing Sorghum (m Tons)	350	1,575	1,575	1,575	1,575	1,575	825	525	175	-	-	-	
Brewing Sorghum Net Return (MK 000)	28	137	122	121	119	118	65	41	13.5	-	-		
Incremental Labor (Mandays 000)							46	30	10	-	-		
Guar Beans (m Tons)	485	485	485	1,620	1,620	1,620	485	485	1,620	1,620	1,620	-	
Guar Beans Net Return (MK 000)	79	79	79	264	263	263	79	79	264	263	263		
Incremental Labor (Mandays 000)							30	30	97	97	97		
Leucaena (m Tons)	600	810	1,080	1,620	2,160	2,700	810	1,080	1,620	2,160	2,700	-	
Leucaena Net Return (MK 000)	15	20	27	41	54	67	20	27	41	54	67		
Incremental Labor (Mandays 000)							23	31	46	60	76		
							Net Value (MK 000)	219	374	854	1,179	1,562	
							Incremental Labor (Mandays 000)	183	436	954	1,421	1,998	

MALAWI

SHIRE VALLEY AGRICULTURAL CONSOLIDATION PROJECT

Farm Budgets at Full Development of Project  
(Constant 1976/77 MK at 1982/83 Relative Price Level)

CROP AREA:		Mwanza & Nsanje Hills		Mwanza Valley		Tomali & Makande Plains		East Bank		Tengani & Nsanje Plains	
		Unimproved 1/	Improved 2/	Unimproved 1/	Improved 2/	Unimproved 1/	Improved 2/	Unimproved 1/	Improved 2/	Unimproved 1/	Improved 2/
Cotton	ha	0.10	0.10	0.56	0.56	0.84	0.84	0.30	0.30	-	-
Rainfed Maize	ha	0.90	0.90	0.56	0.56	0.43	0.43	0.45	0.45	0.40	0.40
Dimba Maize	ha	-	-	0.10	0.10	0.08	0.08	0.05	0.05	0.07	0.07
Dimba Rice	ha	-	-	0.10	0.10	0.08	0.08	0.05	0.05	0.07	0.07
White Sorghum	ha	0.10	0.10	0.10	0.10	0.30	0.30	-	-	0.30	0.30
Bulrush Millet	ha	0.04	0.04	0.16	0.16	0.20	0.20	0.10	0.10	0.40	0.40
Other Crops	ha	0.05	0.05	-	-	0.01	0.01	0.01	0.01	0.08	0.08
Total ha		1.25	1.25	1.60	1.60	1.94	1.94	0.96	0.96	1.32	1.32
<b>FARM PRODUCTS AND INPUTS:</b>											
<b>Production:</b>											
Seed Cotton	m ton	0.04	0.08	0.20	0.42	0.29	0.63	0.11	0.23	-	-
Rainfed Maize	m ton	0.54	0.77	0.34	0.48	0.26	0.37	0.27	0.38	0.24	0.34
Dimba Maize	m ton	-	-	0.10	0.18	0.68	0.14	0.05	0.09	0.07	0.13
Dimba Rice	m ton	-	-	0.08	0.11	0.06	0.09	0.04	0.06	0.06	0.08
White Sorghum	m ton	0.05	0.07	0.05	0.07	.14	0.20	-	-	0.14	0.20
Bulrush Millet	m ton	0.02	0.03	0.07	0.10	0.09	0.12	0.05	0.06	0.18	0.24
Groundnuts	m ton	0.02	0.03	0.01	0.02	-	0.01	-	0.01	0.03	0.04
<b>Main Material Inputs: 3/</b>											
Insecticides No. of sprays	x ha	-	0.46	-	2.36	-	3.45	-	1.26	-	0.15
Fertilizer	m ton	-	-	-	0.01	-	0.01	-	0.01	-	0.01
Labor: Unskilled mandays 4/		92	105	151	181	190	230	89	108	96	110
<b>Financial Farm Budget</b>											
Gross Value	MK	61.06	92.74	101.47	179.75	114.30	217.77	55.77	104.60	57.03	81.71
Direct Production Cost	MK	3.25	8.05	4.57	26.60	5.60	36.40	2.73	14.55	2.91	6.66
Net Farm Benefit	MK	57.81	84.69	76.90	163.15	108.70	181.37	53.04	90.05	54.12	75.05
MK Return for manday		0.53	0.66	0.56	0.72	0.49	0.68	0.52	0.73	0.48	0.58
Increment with Project	MK		27		56.25		72.67		37.00		20.93

1/ Unimproved = traditional farms using for all crops unimproved production techniques.

2/ Improved 1 = adopting farms using for all improved production techniques of stage 1.

3/ In addition to seed of the different crops (traditional varieties for unimproved farms and improved seed for improved farms), amortization of sprayer, tools, baskets, transport etc.

4/ Labor is costed at 0. since on the average farm only unskilled labor is used.

February 14, 1978

## MALAWI

## SHIRE VALLEY AGRICULTURAL DEVELOPMENT PROJECT

Commodity Budgets Per Ha at full Development of Project  
(Constant 1976/77 MK at 1982/83 Relative Price Level)

		-----COTTON-----			-----RAINFED MAIZE-----			-----DIMBA MAIZE-----			-----DIMBA RICE-----		
		Unimproved	Improved 1	Improved 2	Unimproved	Improved 1	Improved 2	Unimproved	Improved 1	Improved 2	Unimproved	Improved 1	Improved 2
Production	M Ton	0.35	0.75	1.00	0.60	0.85	1.50	1.00	1.80	2.50	0.80	1.10	1.60
Price	MK/ M Ton	240.00	240.00	240.00	82.00	82.00	82.00	82.00	82.00	82.00	98.77	98.77	98.77
Gross Value	MK	84.00	180.00	240.00	49.20	69.70	123.00	82.00	147.60	205.00	79.00	108.65	158.00
Seed	MK	1.30	1.30	1.30	2.07	2.76	2.76	2.07	2.76	2.76	2.50	2.50	3.00
Insecticides 1/	MK	--	27.68	48.44	--	--	6.92	--	6.92	6.92	--	--	6.92
Fertilizer 1/	MK	--	--	21.66	--	--	21.66	--	21.66	33.48	--	--	21.66
Other Material Inputs 2/	MK	2.44	7.01	12.11	0.44	0.74	1.91	0.63	1.78	2.32	0.58	0.79	1.91
Direct Production Cost	MK	3.74	35.99	81.51	2.51	3.50	33.26	2.70	33.12	45.48	3.08	3.29	33.50
Gross Margin	MK	80.26	144.00	158.49	46.69	66.20	89.74	79.30	113.48	159.52	75.92	105.35	124.50
Unskilled Labor	Man-days	130	165	175	70	80	96	77	96	110	160	170	183
Returns Per Man-day	MK	.62	.87	.90	.67	.83	.93	1.03	1.18	1.44	.48	.62	.68
		-----WHITE SORGHUM-----			-----BULRUSH MILLET-----			-----GROUNDNUTS(Unshelled)-----			Brewing Sorghum	Guar Beans	Leucaena
		Unimproved	Improved 1	Improved 2	Unimproved	Improved 1	Improved 2	Unimproved	Improved 1	Improved 2			
Production	M Ton	0.45	0.65	1.20	0.45	0.60	0.70	0.40	0.55	0.70	1.75	1.90	6.00
Price	MK/M Ton	77.80	77.80	77.80	65.60	65.60	65.60	99.21	99.21	99.21	99.21	176.37	37.50
Gross Value	MK	35.01	50.57	93.36	29.52	39.36	45.92	39.68	54.57	69.45	173.62	158.73	225.00
Seed	MK	0.88	1.32	1.32	0.77	1.32	1.32	6.00	8.00	25.00	1.32	2.75	2.00
Insecticides 1/	MK	--	--	6.92	--	--	--	--	6.92	13.84	13.84	6.92	13.28
Fertilizer 1/	MK	--	--	21.66	--	--	--	--	--	--	21.66	--	--
Other Material Inputs 2/	MK	0.63	0.63	1.65	0.44	0.58	0.74	0.97	2.20	4.45	5.64	3.04	60.66
Direct Production Cost	MK	1.51	1.95	31.55	1.21	1.90	2.06	6.97	17.12	43.29	42.47	12.71	75.94
Gross Margin	MK	33.50	48.62	66.80	28.31	37.46	43.86	32.71	37.45	26.45	131.15	146.02	149.06
Unskilled Labor	Man-days	70	80	90	50	60	65	140	152	155	100	120	175
Returns Per Man-day	MK	.48	.60	.75	.56	.62	.67	.23	.25	.17	1.31	1.20	.85

1/ Including Credit Charge of 15%.

2/ Such as tools, baskets, transportation, sprayer amortization, fence cost (Leucaena).

February 15, 1978



MALAWI

SHIRE VALLEY AGRICULTURAL CONSOLIDATION PROJECT

Fisherman's Budget One Year's Catch

<u>SALE OF CATCH</u>	<u>Unimproved</u>		<u>Improved</u>	
		<u>Traditional</u>	<u>Plank Canoe, Gill Net and Longline</u>	
Gear Used				
Total Catch - (M Tons)		2.7	5.4	
Wet Price - MK/M Ton		66.0	66.0	
Sold as wet (M Tons) <u>1/</u>		1.3	1.1	
Gross Return (MK)		86.00		73.00
Smoked Price - MK (M Ton)		210.00	242.00	
Sold as Smoked (M Ton) <u>2/</u>		0.5	1.5	
Gross Return (MK)		<u>105.00</u>		<u>363.00</u>
Total Gross		<u>191.00</u>		<u>436.00</u>
<u>Production Costs</u>				
Canoe Replacement		4.0	11.0	
Gear Maintenance		50.0	80.0	
Interest		-	15.0	
Kiln Maintenance		-	1.0	
Fuel Wood <u>3/</u>		24.0	30.0	
Total Costs		<u>78.00</u>		<u>137.00</u>
NET RETURN		113.00		299.00
Incremental return improved over unimproved -				186.00

1/ Wet sales by traditional fishermen 50% of catch because primitive smoking pits limit amount smoked.

Wet sales of improved fishermen 20% - which represents family consumed and immediate sales. Availability of modern kilns makes it possible for fishermen to smoke 80% of catch to take advantage of higher prices for better quality products.

2/ Smoked fish reduces to 35% of wet catch by weight.

3/ Firewood consumption by old style smoking pit is about 3/4 of M<sup>3</sup> ton fish while modern kilns consume only 1/3 M<sup>3</sup> per ton fish.

MALAWI

SHIRE VALLEY AGRICULTURAL CONSOLIDATION PROJECT

Government Cash Flow  
(MK'000)

	Year 1 1978/79	Year 2 1979/80	Year 3 1980/81	Year 4 1981/82	Year 5 1982/83	Year 6-10 1983/84	Year 11 1988/89	Year 12-20 1989/90 1998/99	Year 21 1999/2000	Year 22-25 2000/01- 2003/04
<u>CASH INFLOW</u>										
A. IDA Credit Disbursement	2,727	3,090	2,000	1,910	-	-	-	-	-	-
B. ADMARC Profit on Cotton Trading <sup>1/</sup>	<u>11</u>	<u>85</u>	<u>192</u>	<u>229</u>	<u>181</u>	<u>905</u>	<u>181</u>	<u>1,629</u>	<u>181</u>	<u>724</u>
C. Total Cash Inflow	2,738	3,175	2,192	2,139	181	905	181	1,629	181	724
<u>CASH OUTFLOW/IDA CREDIT SERVICE</u>										
D. Capital Repayment <sup>2/</sup>	-	-	-	-	-	-	97	833	264	1,210
E. Service Charge <sup>3/</sup>	20	44	59	73	73	365	72	624	64	239
F. Project Cost <sup>4/</sup>	<u>4,354</u>	<u>2,761</u>	<u>2,398</u>	<u>1,930</u>	<u>527</u>	<u>2,635</u>	<u>527</u>	<u>4,743</u>	<u>527</u>	<u>2,108</u>
G. Total Cash Outflow	4,374	2,805	2,457	2,003	600	3,000	696	6,200	855	3,557
H. Net Cash Inflow (Outflow)	(1,636)	370	(265)	136	(419)	(2,095)	(515)	(4,571)	(674)	(2,833)
I. Cumulative Cash Inflow (Outflow)	(1,636)	(1,266)	(1,531)	(1,395)	(1,814)	(3,909)	(4,424)	(8,995)	(9,669)	(12,502)

<sup>1/</sup> ADMARC's Profits are assumed to be benefits to the government for this purpose and have been calculated on the basis of actual average profit on cotton purchase of the last five years, i.e., 57% of purchase price; they relate to the incremental cotton production of the Consolidation Project only and include the price contingency for local costs for year 1 to 4.

<sup>2/</sup> Based on IDA terms of 10 years of grace, 1 percent p.a. repayment of principle for years 11 to 20, and 3 percent p.a. for years 21 to 50.

<sup>3/</sup> Based on IDA terms of 3/4 of a percent service charge on the amount of credit withdrawn and outstanding from time to time.

<sup>4/</sup> Excluding price contingency from 1982/83 onwards.

May 11, 1978

MALAWI

SHIRE VALLEY AGRICULTURAL CONSOLIDATION PROJECT

Economic Cost and Benefit Streams  
1976/77 Constant MK'000

	COSTS				BENEFITS			
	C2	C3	C4	C5	B2	B3	B4	B5
	Phase II Costs	Phase III Total Costs	Includes Livestock III	and Fisheries III	Phase II Benefits	Phase III Total Benefits	Includes Livestock III and	Fisheries III
1968/69	-	-	-	-	-	-	-	-
1969/70	-	-	-	-	-	-	-	-
1970/71	-	-	-	-	-	-	-	-
1971/72	-	-	-	-	-	-	-	-
1972/73	-	-	-	-	-	-	-	-
1973/74	1,550	-	-	-	73	-	-	-
1974/75	2,103	-	-	-	79	-	-	-
1975/76	1,649	-	-	-	374	-	-	-
1976/77	1,724	-	-	-	418	-	-	-
1977/78	1,452	-	-	-	645	-	-	-
1978/79	281	3,019	332	125	581	250	-	-
1979/80	281	1,720	190	82	579	466	29	47
1980/81	281	1,355	138	82	581	1,030	87	93
1981/82	281	1,246	126	78	579	1,394	154	140
1982/83	281	454	74	19	581	1,777	231	186
1983/84	281	454	74	19	577	1,806	260	186
1984/85	281	454	74	19	577	1,836	290	186
1985/86	281	454	74	19	577	1,836	290	186
1986/87	281	454	74	19	577	1,836	290	186
1987/88	281	454	74	19	577	1,836	290	186
1988/89	281	454	74	19	577	1,836	290	186
1989/90	281	454	74	19	577	1,836	290	186
1990/91	281	454	74	19	577	1,836	290	186
1991/92	281	454	74	19	577	1,836	290	186
1992/93	281	454	74	19	577	1,836	290	186
1993/94	281	454	74	19	577	1,836	290	186
1994/95	281	454	74	19	577	1,836	290	186
1995/96	281	454	74	19	577	1,836	290	186
1996/97	281	454	74	19	577	1,836	290	186
1997/98	281	454	74	19	577	1,836	290	186
1998/99	281	454	74	19	577	1,836	290	186

Project ERRS

1. Costs and benefits of the Consolidation (Phase III) alone results in an ERR of 20.0%.
2. Combining costs and benefits of Phases II and III results in an ERR of 8%.
3. Reducing Phase III benefits by 25% and maintaining Phase III costs as above lower the ERR to 12%.
4. Reducing Phase III crop yield increases from the projected 40% to a 20% increase results in an ERR of 17%.
5. Increasing the rate farmers, adopt new practices by 10% results in a 25%

## MALAWI

## SHIRE VALLEY AGRICULTURAL CONSOLIDATION PROJECT

Project Equipment, Machinery, Housing and Civil Works  
(MK)

<u>Vehicles and Equipment</u>	<u>Unit Cost</u>	<u>Year 1</u> <u>(1978/79)</u>	<u>Year 2</u> <u>(1979/80)</u>	<u>Year 3</u> <u>(1980/81)</u>	<u>Year 4</u> <u>(1981/82)</u>	<u>Total</u>
Pick-up	6,000	(4) 24,000	(4) 24,000	6,000		36,000
Four wheel drive	8,000	(17) 136,000	(8) 64,000	(2) 16,000		216,000
Other Vehicles (vans etc.)	various	(2) 21,400	(2) 26,000	(1) 12,000		59,400
Motor cycles	800	(60) 48,000	(13) 10,400	(3) 2,400	(17) 13,600	74,400
General Equipment	various	33,000	21,200		1,000	54,200
Farm Tractors and Equipment	various	(6) 70,600	(2) 29,300	(2) 26,800		127,700
Trucks	various	(5) 79,500	(2) 24,000			103,500
Seed Farm irrigation system		540,000				540,000
Well Driller			157,000			157,000
<u>Road Equipment</u>						
Grader		65,000				65,000
Compressor		11,000				11,000
Other Misc.		18,500	6,000	6,000		30,500
Sub Totals-Vehicles & Equip.		1,047,000	343,900	69,200	14,600	1,474,700
<u>Boreholes</u>	1,700		(10) 17,000	(15) 25,500	(15) 25,500	68,000
<u>Shallow Wells</u>	750	(10) 7,500	(10) 7,500	(10) 7,500	(10) 7,500	30,000
		7,500	24,500	33,000	33,000	98,000
<u>Housing &amp; Civil Works</u>						
DL-3 Houses	15,000	(7) 105,000	(2) 30,000	15,000		150,000
EL-2A "	6,000	(9) 54,000	(3) 18,000			72,000
EL-2 "	5,000	(44) 220,000	(11) 55,000	(7) 35,000	(5) 25,000	335,000
Conversions of PL Houses	2,000	(20) 40,000	(15) 30,000	(15) 30,000	(15) 30,000	130,000
Other (office blocks)		20,000	20,000	10,000		50,000
Training Centers		3,100	3,600	1,500	1,600	9,800
Laboratories & Offices		33,000	82,000			115,000
Fish Landing sites		10,000	10,000	10,000	10,000	40,000
Forest stations		15,000	15,000	15,000		45,000
Low Cost Housing		13,000	4,000	5,000	1,500	23,500
Health facilities & Chalets		39,700	20,000			59,700
Road Construction		24,500	30,500	24,500	9,500	89,000
Dip Tanks-etc.		10,000	5,000			15,000
Sub-Totals-(Housing & Civil Wks)		587,300	323,100	146,000	77,600	1,134,000
<u>Office Equipment</u>						
Calculators	600	(3) 1,800	600	600		3,000
Photo Copier	5,000		5,000			5,000
Typewriters	400	(3) 1,200	400	400		2,000
Other office Equipment	various		1,000			2,000
Card Puncher			2,000			2,000
Sub Total		11,000	2,000	1,000		14,000

<sup>1/</sup> Costs do not include contingencies

May 10, 1978

MALAWI

SHIRE VALLEY AGRICULTURAL CONSOLIDATION PROJECT

\* Selected Documents and Data Available in the Project File

A. Selected Reports on the Development Potential of the Lower Shire Valley

1. Lockwood Report - 1968-70
2. Halcrow Report - 1974
3. FAO Report on Livestock and Dairy Improvement - 1971
4. Malawi Government Statement of Development Policies 1971-1980
5. Bradford/Groundnuts Reconnaissance Study - 1973

B. Selected Reports on Phases I and II of the Project

- B.1 P.P.A.R. for Phase I
- B.2 SVADP Phase II - Review of Agricultural Activities July 1974
- B.3 Malawi Government Crop Marketing and Price Projections - 1977
- B.4 Malawi Government Compendium of Agricultural Statistics - 1977
- B.5 Agro. Economic Survey/Groundnut Growers of Nsanje District of SVADP - 1972
- B.6 Malawi Government/Marketing of Smallholder Agricultural Produce.

C. Selected Working Papers

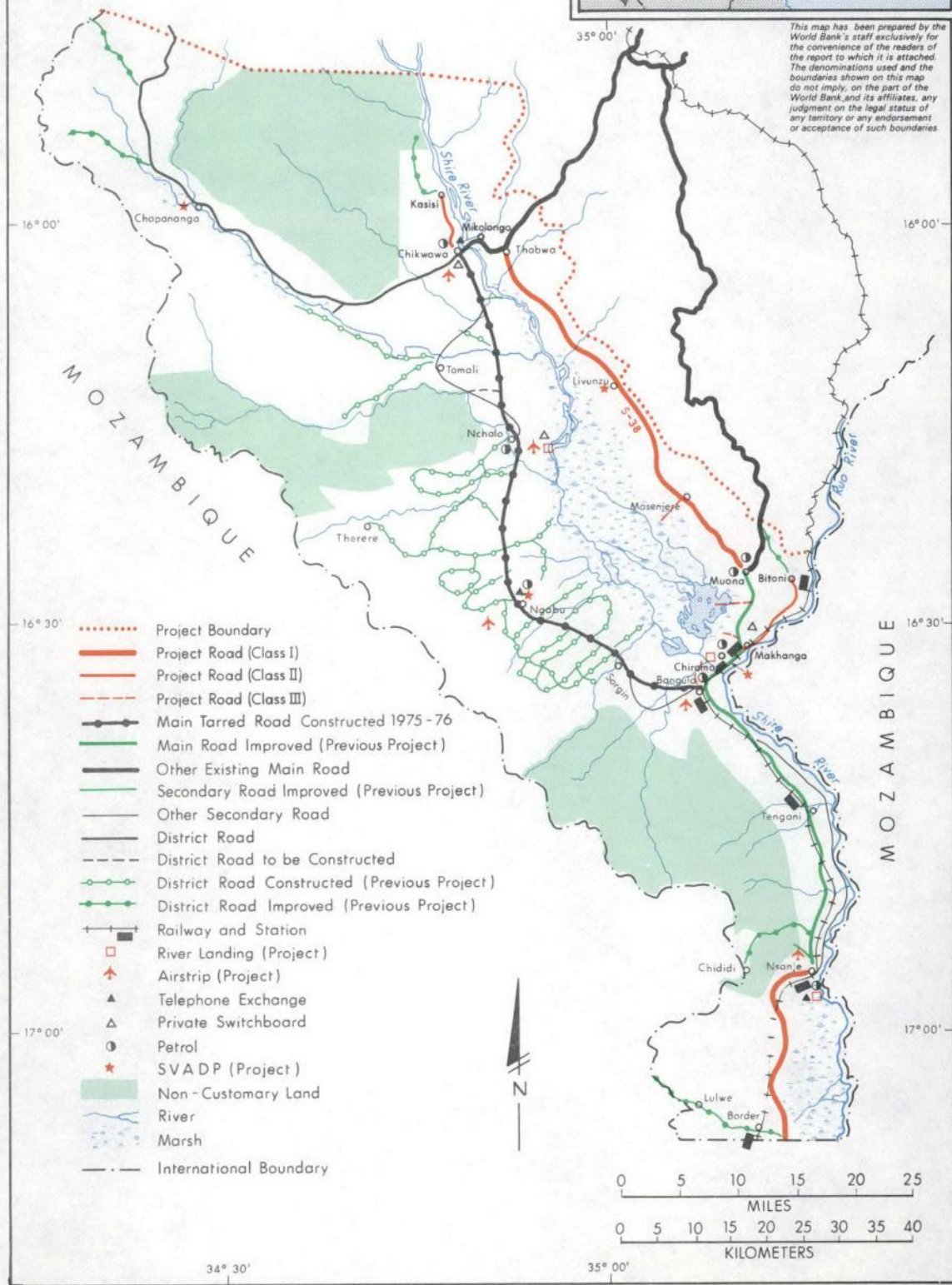
- C.1 Project Component Cost Tables (18)
- C.2 Project Component detailed descriptions of activities, Extension, Training, Research, Seed Multiplication, Credit, Animal Husbandry, Land Husbandry, Fisheries, Forestry, Wildlife, Hydrology and Water Supply, Health, Road Construction, Management, Building and Mechanical Maintenance and Evaluation.

\*THE doc. were sent by M. Frankel's Sec...  
but never reach the inform. center - 8/12/78

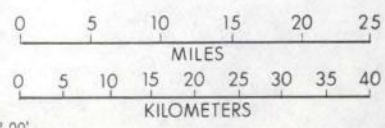
# MALAWI SHIRE VALLEY AGRICULTURAL DEVELOPMENT PROJECT COMMUNICATIONS



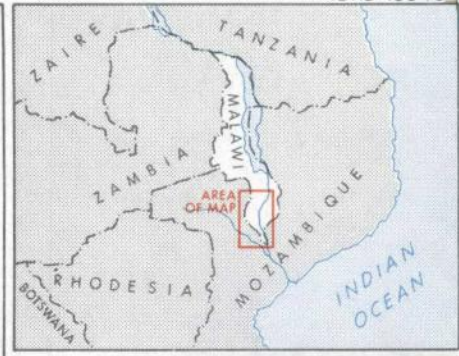
This map has been prepared by the World Bank's staff exclusively for the convenience of the readers of the report to which it is attached. The denominations used and the boundaries shown on this map do not imply, on the part of the World Bank and its affiliates, any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries.



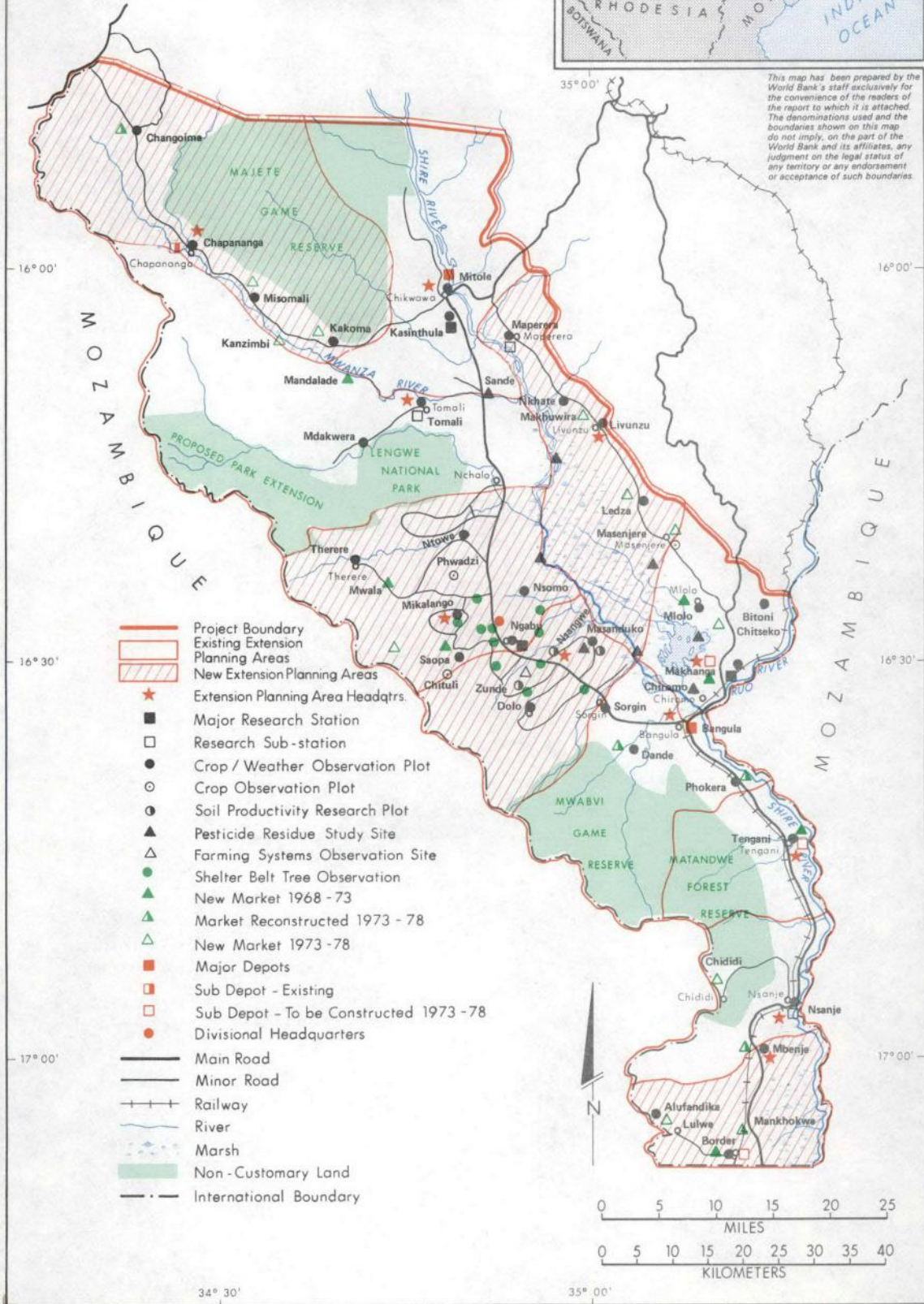
- ..... Project Boundary
- Project Road (Class I)
- Project Road (Class II)
- Project Road (Class III)
- Main Tarred Road Constructed 1975-76
- Main Road Improved (Previous Project)
- Other Existing Main Road
- Secondary Road Improved (Previous Project)
- Other Secondary Road
- District Road
- District Road to be Constructed
- District Road Constructed (Previous Project)
- District Road Improved (Previous Project)
- + ——— Railway and Station
- River Landing (Project)
- ▲ Airstrip (Project)
- ▲ Telephone Exchange
- ▲ Private Switchboard
- Petrol
- ★ SVADP (Project)
- Non-Customary Land
- ~ River
- ~ Marsh
- International Boundary



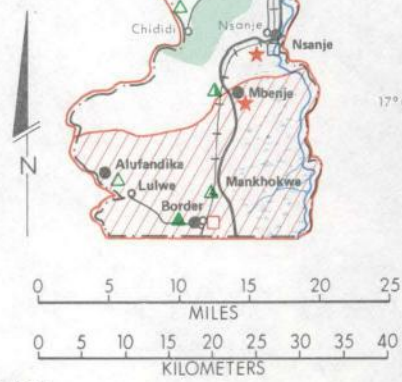
# MALAWI SHIRE VALLEY AGRICULTURAL DEVELOPMENT PROJECT AGRICULTURAL RESEARCH, ADMARC, AND EXTENSION PLANNING AREAS



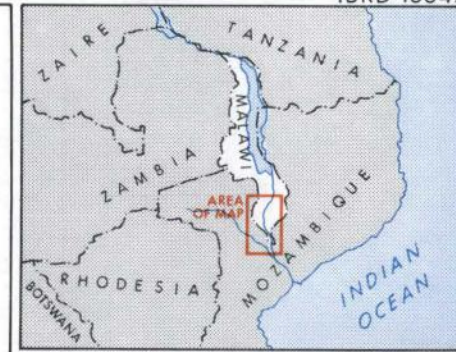
This map has been prepared by the World Bank's staff exclusively for the convenience of the readers of the report to which it is attached. The denominations used and the boundaries shown on this map do not imply, on the part of the World Bank and its affiliates, any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries.



- Project Boundary
- Existing Extension Planning Areas
- New Extension Planning Areas
- ★ Extension Planning Area Headqtrs.
- Major Research Station
- Research Sub-station
- Crop / Weather Observation Plot
- Crop Observation Plot
- Soil Productivity Research Plot
- ▲ Pesticide Residue Study Site
- △ Farming Systems Observation Site
- Shelter Belt Tree Observation
- ▲ New Market 1968 - 73
- △ Market Reconstructed 1973 - 78
- △ New Market 1973 - 78
- Major Depots
- Sub Depot - Existing
- Sub Depot - To be Constructed 1973 - 78
- Divisional Headquarters
- Main Road
- Minor Road
- Railway
- River
- ~ Marsh
- Non - Customary Land
- International Boundary



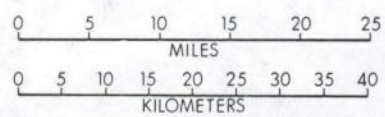
# MALAWI SHIRE VALLEY AGRICULTURAL DEVELOPMENT PROJECT HEALTH FACILITIES AND BOREHOLES



*This map has been prepared by the World Bank's staff exclusively for the convenience of the readers of the report to which it is attached. The denominations used and the boundaries shown on this map do not imply, on the part of the World Bank and its affiliates, any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries.*

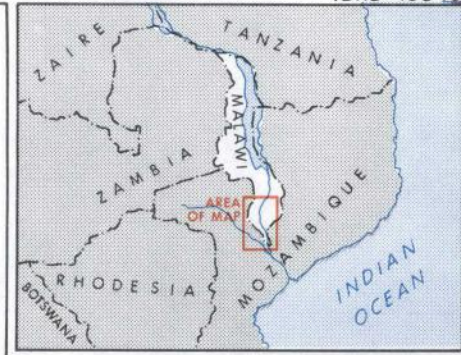


- Project Boundary
- ▲ Primary Health Center
- △ Health Sub-center
- Health Post
- Health Unit
- To be Upgraded
- Proposed New Buildings
- Boreholes, Project
- Boreholes, Non - Project
- Main Road
- Minor Road
- Railway
- River
- Marsh
- Non - Customary Land
- International Boundary

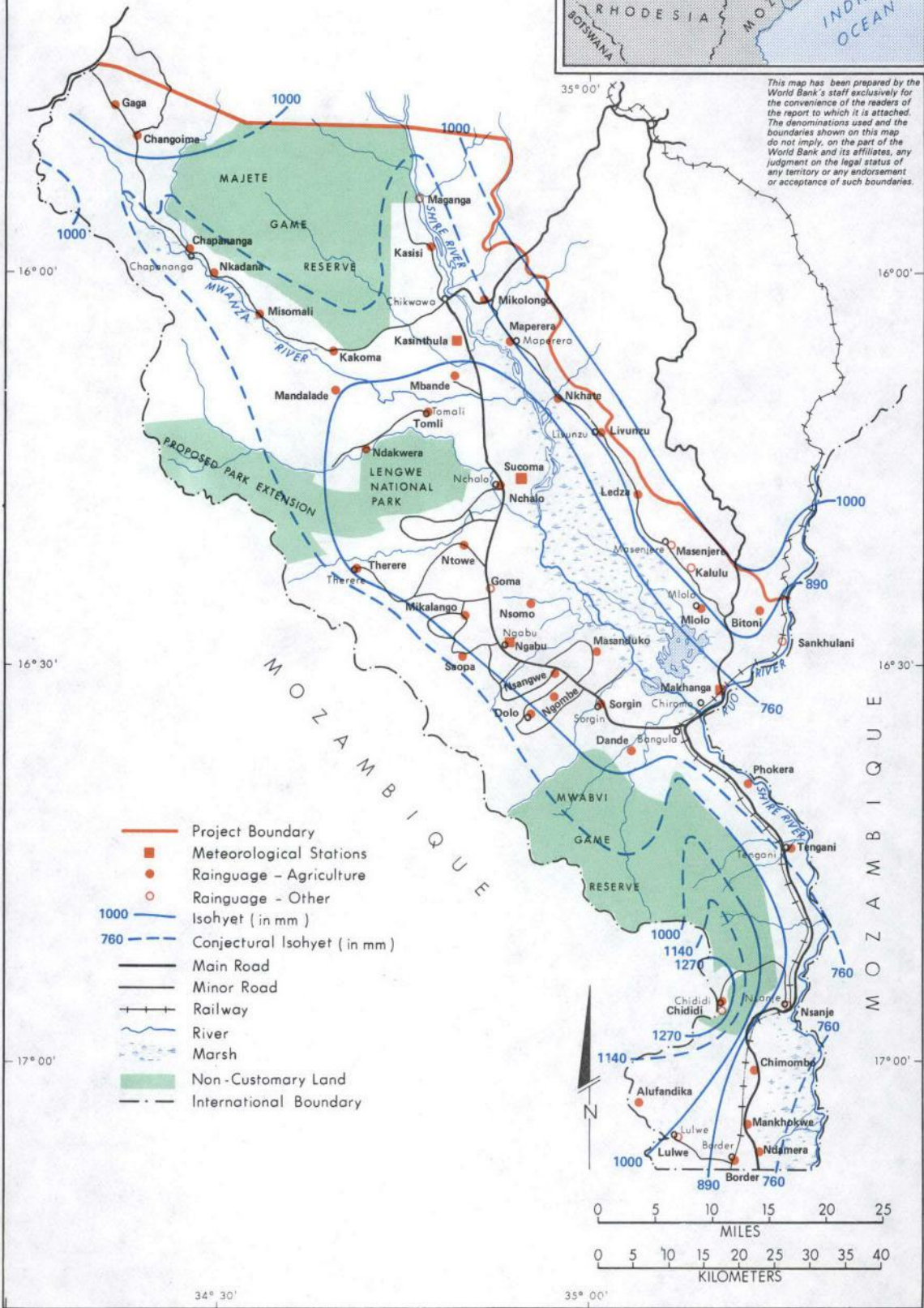




# MALAWI SHIRE VALLEY AGRICULTURAL DEVELOPMENT PROJECT METEOROLOGY



*This map has been prepared by the World Bank's staff exclusively for the convenience of the readers of the report to which it is attached. The denominations used and the boundaries shown on this map do not imply, on the part of the World Bank and its affiliates, any judgment on the legal status of any territory or any endorsement or acceptance of such boundaries.*



- Project Boundary
- Meteorological Stations
- Rain gauge - Agriculture
- Rain gauge - Other
- 1000 — Isohyet (in mm)
- 760 - - - Conjectural Isohyet (in mm)
- Main Road
- Minor Road
- + + + Railway
- River
- Marsh
- Non-Customary Land
- - - International Boundary

