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Malawi: Appraisal of the Karonga Rural Development Project, Phase II

May 20, 1976

East Africa Region-General Agricultural Division

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CURRENCY EQUIVALENTS

Currency Unit = Malawi Kwacha (MK) = 100 Tambala (t)
US\$1.00 = MK 0.90
MK1.00 = US\$1.11

WEIGHTS AND MEASURES

1 lb = 0.453 kg
1 sh ton = 2,000 lb = 0.9072 m ton
1 ac = 0.405 ha
1 sq mile = 2.59 sq km
1 bag maize = 200 lb
1 bag fertilizer = 50 kg

ABBREVIATIONS

KRDP = Karonga Rural Development Project
LLDP = Lilongwe Land Development Project
SVADP = Shire Valley Agricultural Development Project
CRLDP = Central Region Lakeshore Development Project
NRDP = National Rural Development Program
MANR = Ministry of Agriculture and Natural Resources
MOW = Ministry of Works and Supplies
MOH = Ministry of Health
MOE = Ministry of Education
ADMARC = Agricultural Development and Marketing Corporation
NOIL = National Oil Industries Limited
ADS = Agriculture Development Service (IBRD)

Malawi Government and KRDP Fiscal Year

April 1 to March 31

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KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

SUMMARY AND CONCLUSIONS

i. During the last eight years the Bank Group has made an important contribution to the development of Malawi's smallholder agriculture through a total of six IDA Credits for three major rural development programs. The first, the Lilongwe Land Development Program (LLDP) in the Central Region started in 1968/69 and is now in its third and final phase. The second is the Shire Valley Agricultural Development Project (SVADP) in the Southern Region which commenced in 1969/70 and is now in its second phase. The third is the Karonga Rural Development Project (KRDP) in the Northern Region which started in 1972/73 and is now completing its first phase.

ii. All these programs are characterized by:

- (a) the provision of infrastructure, such as rural roads, input stores and produce markets, health facilities (both for people and cattle), boreholes and housing and office accommodation for project staff;
- (b) land improvements, comprising land consolidation (and in LLDP land registration), irrigation development and conservation works;
- (c) strengthening of extension, marketing, research and public health staffing; and
- (d) establishment of credit facilities for agricultural inputs such as fertilizer, seeds, insecticides, work-oxen and farm implements.

These comprehensive programs are implemented in the more densely populated areas of the country and would, at their completion, cover about one million people, or one quarter of the total population. While they are making a significant contribution both to institution building and to an improved standard of living for large numbers of people, a change of emphasis is needed to provide over a reasonable time period the remaining three quarters of Malawi's farm population with improved production opportunities. In 1973, a Bank agriculture sector mission therefore recommended, and the Government has decided to adopt, a strategy which would give priority to investments with an immediate impact on agricultural production (particularly in areas which have some infrastructure such as roads), while other investments, which either are relatively costly or have a lesser direct impact on production would be made in the more distant future. Good progress has now been made in designing a National Rural Development Program (NRDP) which would be implemented through some 40-50 sub-projects over a period of about 20 years. The Government is expected to seek the support of external financing agencies for future NRDP sub-projects.

iii. The new strategy for NRDP is already to some extent reflected in the design of the second phase of KRDP for which Government has now requested Bank assistance. The Project would make full use of infrastructure established under the first project and would over four years further improve and expand the extension, animal husbandry, land husbandry, agricultural research, crop marketing, credit and human health services in Karonga and Chitipa districts. This would involve recruitment of new staff and training of both existing and new staff, construction of some additional housing, offices, marketing and health facilities, and continued financial support for the Project's credit fund. The Project would also construct additional boreholes, rural roads, minor bridges, culverts and drifts in the two districts and the Project's evaluation section would continue to monitor and analyze the Project's progress. There would be no further irrigation development which characterized the first Karonga project.

iv. Moreover the Project would over two years support the preparation of the National Rural Development Program through the strengthening of essential services in the Ministry of Agriculture and Natural Resources (MANR), which would administer NRDP, and through preliminary investments, mainly in staff housing, in three selected NRDP development areas. Finally the Project would over two years improve and expand berthing and handling facilities at the port of Chipoka at the southern end of Lake Malawi, which were originally provided for in the first project but not implemented because of cost overruns in other parts of the Lake Transport component.

v. MANR would have overall responsibility for implementing the Project, except for the health component, which would be the responsibility of the Ministry of Health, the construction of crop markets and input stores, which would be the responsibility of the Agricultural Development and Marketing Corporation (ADMARC) and the Lake Transport component, which would be administered by the Ministry of Transportation and Communications through Malawi Railways Limited. The KRDP management unit established under the first project would have specific responsibility for agricultural development in Karonga and Chitipa districts and the Ministry's Director of Extension and Training, assisted by a NRDP coordinator, would be responsible for the implementation of the NRDP preinvestment phase. ADMARC would continue to supply seasonal inputs and to purchase the farmers' crop produce.

vi. Total project costs, including physical and price contingencies, are estimated at US\$12.1 million. IBRD (Third Window) would finance 75% of the costs (US\$9.2 million) or all foreign exchange costs (US\$6.3 million) and about 48% of the local costs. ADMARC would finance the construction of the input stores and crop markets (US\$0.8 million or 7% of Project costs) and Government the remaining 18% (US\$2.1 million). No taxes or duties are levied except personal income tax on salaries which is insignificant.

vii. Vehicles, machinery and equipment in orders exceeding US\$50,000 would be procured by international competitive bidding in accordance with Bank guidelines. Farm inputs and drugs would be procured in accordance with normal Government procedures which are satisfactory to the Bank. The port facilities at Chipoka would be constructed under international competitive bidding. All

other civil works would be constructed by force account by MANR, KRDP, the Ministry of Works, or ADMARC.

viii. The chief benefits of the Project would be the increased production of rice, maize, groundnuts and cotton in Karonga and Chitipa districts. At full development, to be reached in year 5 (1980/81) in Karonga and in year 9 (1984/85) in Chitipa, the total annual incremental production of the Phase I and II Projects would be about 6,000 sh ton paddy, 1,450 sh ton groundnuts (shelled), 10,400 sh ton maize and 1,300 sh ton cotton of which about two thirds would be generated by the Phase II project. In the livestock sector further increases in cattle production (beyond those caused by the first project) are likely but it is not possible to quantify these benefits because reliable data area lacking. Other non-quantifiable benefits would be generated by investments in research, health facilities and boreholes. The improvement to the port of Chipoka would increase its capacity, decrease ship turn around time, increase the productivity of cargo handling and reduce cargo damage.

ix. The internal economic return on the second Phase investments in Karonga and Chitipa districts is estimated at 14%. The major risks facing the Project are that adoption rates of improved crop husbandry methods and the increases of crop yields would be lower than forecast; a 10% reduction of the benefits would reduce the rate of return to 8%. As a result of the Project a typical farmer cultivating 4 acres in Karonga's rainfed rice area would increase his annual income from crops from MK 166 (US\$184) to MK 214 (US\$238); a 4 acre dryland crop farmer in Karonga would increase his income from MK 64 (US\$71) to MK 115 (US\$128) and a 4 acre farmer in Chitipa would increase his annual income from crops from MK 72 (US\$80) to MK 99 (US\$110). Farmers in Chitipa who would use work oxen for land preparation are expected to double the cultivated area and to increase their annual income from crops to MK 188 (US\$209). Ultimately a total of about 14,400 farm households would increase their income from crops as a result of the Phase I and II Karonga Projects. The internal rate of return of the Lake Transport component is 18%. No economic rate of return can yet be calculated on the pre-investments under the NRDP component during the first two Project years. Appropriate proportions of these pre-investments would be included in the economic evaluation of the first full-fledged NRDP project which is scheduled to be appraised in late 1977. The aggregate internal rate of return of the whole Project is estimated at 16%.

x. Since 1964 Malawi has received thirteen IDA Credits totalling US\$96.8 million. Apart from the six Credits for rural development projects Credits have been extended for road development and engineering, power, education and for transport engineering and services connected with a wood and pulp project. Project implementation has generally been satisfactory although cost overruns have occurred in the last two years. The first Karonga project had a slow start, because of initial staffing problems, and some of the original targets, particularly for irrigation development, were reduced. The project is now progressing satisfactorily but because of cost overruns, mainly in the construction sector, the project period was reduced from five to four years.

xi. The Project is suitable for an IBRD (Third Window) loan of US\$9.2 million.

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

I. INTRODUCTION

1.01 The Karonga Rural Development Project (KRDP), which commenced in 1972/73 in the Northern Region and is now completing its first phase, forms part of the third agricultural development program financed by IDA in Malawi. KRDP was preceded by two similar programs which were designed to assist the country's small farmers. The Lilongwe Land Development Program (LLDP) in the Central Region was the first (1968/69) and is now in its third and final phase. The Shire Valley Agricultural Development Project (SVADP) in the Southern Region which followed in 1969/70 is now in its second phase. A fourth major project, the Central Region Lakeshore Development Project (CRLDP) was assisted by the Federal Republic of Germany.

1.02 All these programs are characterized by:

- (a) the provision of infrastructure, such as rural roads, input stores and produce markets, health facilities (both for people and cattle), boreholes and housing and office accommodation for project staff;
- (b) land improvements, comprising land consolidation (and in LLDP land registration), irrigation development and conservation works;
- (c) strengthening of extension, marketing, research and public health staffing; and
- (d) establishment of credit facilities for agricultural inputs such as fertilizer, seeds insecticides, work-oxen and farm implements.

These comprehensive programs are implemented in the more densely populated areas of the country and would, at their completion, cover about one million people, or one quarter of the total population. While they are making a significant contribution both to institution building and to an improved standards of living for large numbers of people, a change of emphasis is needed to provide over a reasonable time period the remaining three quarters of Malawi's farm population with improved production opportunities. In 1973, a Bank agriculture sector mission therefore recommended, and the Government has decided to adopt, a strategy which would give priority to investments with an immediate impact on agricultural production (particularly in areas which have some infrastructure such as roads) while other investments, which either are relatively costly or have a lesser direct impact on production would be made in the more distant future. Good progress has now been made in designing a National Rural Development Program (NRDP) which would be implemented through some 40-50 sub-projects over a period of about 20 years. The Government is expected to seek the support of external financing agencies for future NRDP sub-projects.

1.03 The new strategy is already to some extent reflected in the design of the second phase of KRDP, which would be enlarged to include the sparsely populated Chitipa district, and for which Government has now requested Bank assistance. The main emphasis would be given to strengthening of extension and farmer services, including agricultural credit. The Project would make full use of existing infrastructure, and investments in additional infrastructure, mainly in Chitipa district, would be restricted to the necessary minimum. There would be a significant reduction in the emphasis on land consolidation and there would be no further irrigation development which characterized the first Karonga project. The Government also requested financing of a preliminary investment phase of NRDP to prepare the ground for a full-fledged NRDP project scheduled to commence in 1978. A third component of the Project is the improvement and expansion of berthing and handling facilities at the port of Chipoka at the southern end of Lake Malawi, originally provided for in the first phase of KRDP but not implemented because of cost overruns in other parts of the Lake Transport component.

1.04 Some of Government's original proposals were modified in the course of the appraisal. No convincing evidence could be found to justify major investments for the improvement of Malawi's smallholder coffee as was requested and it was agreed instead to include a provision for a special study to determine the potential for future coffee development. The Government withdrew a request for fishery investigations in the northern part of Lake Malawi when it became clear that this component could be included in a UNDP financed fisheries project. The scope of the proposed NRDP preliminary investment phase was reduced in order to allow more time to establish the necessary institutional framework and to collect and analyze essential data on which specific development proposals are to be based.

1.05 Since 1964 Malawi has received thirteen IDA credits totalling US\$96.8 million. Apart from six credits for rural development projects - three for Lilongwe, two for the Lower Shire and one for Karonga - other credits have been extended for road development and engineering, power, education and for transport engineering and services connected with a wood and pulp project. Project implementation has generally been satisfactory, although cost overruns have occurred in the last two years. Owing to initial staffing problems, the first phase of KRDP had a slow start but is now progressing satisfactorily. Some of the original targets of the project, particularly with regard to irrigation development, have been reduced. Because of cost overruns, mainly in the construction sector, the project period was reduced from five to four years. These and other aspects are discussed in Chapter II.

1.06 The proposed Project was prepared by the Government with assistance from the IBRD Regional Mission in Eastern Africa. This report is based on the findings of an appraisal mission composed of Messrs. H. van Voorthuizen and K. Niemann (IBRD), P. Reid and G. Kerkhoven (Consultants), and A. Goala (ADB), which visited Malawi in October/November 1975; Messrs. K. Krishna and J. Russell (IBRD) assisted the mission during the field appraisal. The Lake Transport proposals were appraised by Messrs. D. Raymond, who visited Malawi in February 1976, and J-O Fraisse (IBRD).

II. BACKGROUND

A. General

2.01 Malawi, a landlocked country in southeast Africa, is bordered on the south by Mozambique, on the northwest by Zambia and on the northeast by Tanzania. It has a total land area of about 36,000 square miles, and the current population, estimated at 4.8 million, is increasing at about 2.6% per annum. About 90% of the population lives in rural areas, but the urban population is now estimated to be increasing at twice the rate of the rural population.

2.02 Between 1965 and 1975 Malawi's gross domestic product (GDP) grew, in real terms, by an average of 7.3% per year to reach an estimated MK 668 million (US\$775 million), at current prices, in 1975. Per capita income was US\$110 in 1973 (1975 World Bank Atlas). Whereas the Government has received external support for its recurrent budget for many years, it has since 1972/73 financed recurrent expenditures entirely out of domestic revenues. Development expenditures, however, are expected to be heavily dependent on foreign sources of finance.

B. The Agricultural Sector

2.03 Agriculture remains the most important sector of the Malawi economy and employs about 90% of the population. Other sectors have, however, been growing fast in the last few years and agriculture's contribution to GDP declined from about 50% in 1971-72 to about 45% in 1974/75. The real annual growth of the agricultural sector ranged between 2 and 4% during the three year period 1972/73-1974/75. In 1974 agriculture accounted for 92% of the total domestic export earnings. The main export crop is tobacco (43% of total 1974 domestic export earnings), while tea (19%), sugar (10%), groundnuts (6%), and other crops (14%), accounted for the balance. Smallholder agricultural production had a 35% share in the total domestic export earnings and estates 57%. The export value in current terms of smallholder crops (mainly groundnuts, rice, fire-cured tobacco, cotton, pulses and maize) has grown from MK 12.2 million in 1964 to MK 31.5 million in 1974 though with considerable annual fluctuations.

2.04 Farm holdings are generally small (averaging about 3.5 acres), and their size is dictated in part by the scarcity of additional cultivable land and by the size of the family. Average population density is 138 per square mile but is two times as high in the most productive areas of the Central and Southern Regions. Over the past decade increased food requirements have been met mostly through an expansion of cultivated area. This in turn has meant that land more susceptible to erosion has been cropped, and fallow periods have been reduced. In view of the current need to maintain soil fertility and to reduce pressure on land, the emphasis of agricultural policy is now on increased productivity.

2.05 Maize is by far the most important smallholder crop, and is grown on 80% of all cultivated land; other important food crops are pulses, groundnuts and cassava, and, to a lesser extent, rice, sorghum and wheat. The sharp fertilizer price increase during the last two years was a serious setback for the ongoing efforts to increase agricultural production.

2.06 Only about 10% of rural families own cattle. The total number within Malawi is estimated at about 600,000 head in 1974, of which about 180,000 are in the Northern Region. The offtake rate is about 9%. The Department of Animal Health in the Ministry of Agriculture aims to expand livestock production through the introduction of more productive cattle breeds, through artificial insemination and selective breeding to upgrade the local Zebu cattle, and through a disease control program aimed at the eradication of Foot and Mouth Disease, East Coast Fever and Tuberculosis.

C. Agricultural Services

2.07 The Ministry of Agriculture and Natural Resources (MANR) is primarily responsible for the provision of services to the agricultural sector. It operates through five departments: Extension and Training, Animal Health, Fisheries, Research, and Technical Services. The Ministry is also responsible for the four major agricultural development projects. Almost all organized smallholder credit in Malawi is provided through these projects.

2.08 The Agricultural Development and Marketing Corporation (ADMARC) is 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; for the latter ADMARC views itself only as a residual buyer, purchasing only that output which farmers choose to market through it. Significant amounts of smallholder produce are either sold to private traders or bartered among the farmers themselves. In addition ADMARC supplies inputs, such as fertilizer, seed, and agricultural equipment to smallholders. Produce prices for most crops are announced each year before the start of the planting season by ADMARC with the approval of the Minister of Agriculture. In the recent years ADMARC has accumulated substantial crop marketing surpluses particularly from trading in tobacco, cotton and groundnuts and these have been applied to a variety of development projects. ADMARC also devotes part of its surplus to a price-equalization reserve to stabilize producer prices, and maintains a small food reserve stock. ADMARC is the majority shareholder of, and effectively controls, the National Oil Industries Limited (NOIL) which owns and operates five rice mills and an oil expression plant for cotton seed (Annex 4).

2.09 Most of MANR's technical and field staff receives its formal agricultural training either at Bunda Agricultural College, which is part of the University of Malawi, or at Colby College of Agriculture, which is under MANR. Bunda offers a three year course leading to a Diploma in Agriculture and a four year course which leads to a Bachelor of Science in Agriculture degree. USAID has recently agreed to finance an expansion of Bunda's facilities.

Colby College offers a two-year course, which leads to a certificate in agriculture. Other institutions involved in training agricultural staff include the Mikolongwe School and Livestock Improvement Center which offers a two year course for veterinary assistants, the Thuchila Farm Institute, the main training center for women which has a one-year course for Farm Home Instructresses, and also schools for fisheries and forestry assistants. MANR would like to concentrate the various courses for field level workers in one location and for some years has been contemplating the establishment of a Natural Resources College at the site of the present Colby College near Lilongwe. The proposals are now finalized for submission to potential financing agencies. The Ministry also organizes in-service training programs for extension staff and conducts farmer training courses in about 20 residential and 70 day centers (Annex 6).

D. Karonga Rural Development Project, Phase I

2.10 KRDP, Phase I, was appraised in April 1971 and consisted of a first five-year agricultural development program in the Karonga area, including improvement to health services and transportation. In its original request Government attached much importance to the construction of irrigated rice schemes following the establishment of two irrigation schemes at Hara and Wovwe in the southern part of the Karonga Lake shore. Because of inadequate hydrological data the Government's target of developing 9,000 acres irrigated rice was reduced during appraisal to 1,500 acres in two schemes at Lufira and Wovwe and the development of 6,000 acres of rainfed rice schemes was provided for instead. During the project's implementation, which because of initial staffing problems started only in the second half of 1972, it became clear that the soil permeability in the 1,000 acre scheme at Lufira was much higher than anticipated and concrete lining of the main canals became necessary. The scheme is expected to be completed in the course of 1976, two years behind schedule. Because of the resulting heavy cost overruns at Lufira the development of the 500 acre irrigation scheme at Wovwe has been omitted from the project and no further irrigation development is contemplated at this time.

2.11 The improvement of rainfed rice cultivation is progressing satisfactorily. Simple water control bunds, demarcated by the project's land husbandry section and constructed by the farmers themselves, would be completed on about 5,000 acres by the end of the revised four year project. This is about 1,000 acres short of the original target, mainly because of the late project start. Some 2,500 farmers growing rainfed rice received 215 m ton fertilizer and 150 sh ton improved seeds on credit in 1975; the number of farmers is about one-third above, and the amount of fertilizer some 20% below the appraisal estimates.

2.12 An estimated 8,000 acres of dryland crop land are expected to be demarcated and consolidated by 1976 which compares with 7,800 acres estimated at the appraisal of the first project. Actual improvements of cultivation techniques of maize, cotton and groundnuts are, however, lagging behind appraisal estimates. Fertilizers, improved seeds and insecticides for about 2,200 acres were distributed on credit in 1975 to about 1,500 dryland crop

farmers, whereas the appraisal estimate provided for 5,400 acres by 1,200 farmers. It was erroneously assumed that land consolidation would be followed immediately by improved cultivation techniques on the entire consolidated area and that no improvements would be introduced on non-consolidated land. In fact, however, adoption of improved techniques went much slower, partly because of the high fertilizer costs, while on the other hand many farmers outside the consolidated schemes also started using small amounts of inputs. In contrast with the original appraisal estimate it is now expected that farmers will continue to cultivate about one quarter of the land with cassava and that improved husbandry of maize, cotton and groundnuts will increase over two years, following demarcation, to about 75% of the land (Annex 1).

2.13 The main objective of the livestock development program of the first project was to improve cattle health through the construction of dipping tanks and the provision of vaccines and drugs. This has been carried out satisfactorily and only two additional tanks need to be built under this Project. The first project also provided for four new cattle markets (two in Karonga and two in Chitipa) but only the market built in southern Chitipa turned out to be successful. The other three cattle markets attracted little interest as farmers preferred to sell their cattle locally or across the border to Zambia or Tanzania (Annex 2).

2.14 The construction of staff housing, office accommodation, roads and health facilities has been proceeding satisfactorily and targets will be reached by the end of the project. The project also provided for the construction or improvement of two terminals comprising berthing facilities and associated structures and for a self-propelled vessel for the Lake Transport Service. Because of heavy cost overruns during the construction of the Chilumba terminal in Karonga district no funds were left for the improvement of facilities at Chipoka on the southern end of Lake Malawi. Since this terminal is of great importance for all Lake traffic to and from the north, including Karonga, its construction has now been included in this Project. The self-propelled vessel is assembled and is undergoing sea trials at Monkey Bay (Annex 13).

2.15 Despite the late start and the setbacks during implementation the first project is now performing satisfactorily. Most physical targets will be met by the end of the project and farmers participation is better than anticipated. A first survey of crop yields, conducted by the project's evaluation unit during the 1974/75 season, suggests substantial production increases as a result of the project activities (details are at Annex 1). The experiences gained so far have led to a better understanding of the feasibility and timing of various project activities and the lessons drawn from these experiences have been taken into account in the design of the proposed second Project.

III. THE PROJECT AREA

Karonga and Chitipa Districts (Annex 1)

3.01 Land and crop development under the first Phase of KRDP were limited to the Lake shore area in Karonga district while the livestock development program was implemented in both the Karonga and Chitipa administrative districts. Under the proposed Project agricultural and other developments would also be extended to the parts of Karonga and Chitipa districts which were not covered by the first project. The two districts are located in the extreme north of Malawi and are bordered by Zambia to the west, Tanzania to the north and Lake Malawi to the east (World Bank Map 12040). The area involved covers about 2,950 square miles but physical conditions vary widely.

3.02 Communications. Communications with other parts of Malawi are difficult because of the remote location of the Project area. The construction of the Chilumba-Chiweta road, which connects Karonga town with the south of Malawi and upgrading of the Chitipa-Chisenga-Nthalire road, which connects Chitipa with Rumphu, has improved the situation somewhat. The first 15 miles of the Karonga-Chitipa road continue to pose problems during the wet season; upgrading of this road to all-weather conditions has been considered but found too costly because of the very instable black-cotton soil. During the dry season there are no problems and transport of heavy goods, such as construction materials, fertilizers and crop produce should be carefully planned to avoid wet season disruptions. The construction under the first project of the Chilumba terminal in south Karonga in addition to the existing port at Kambwe, near Karonga town, has improved the efficiency of the Lake Malawi Service for Karonga district.

3.03 Land and Population. The Lake shore area in Karonga district is about 80 miles long and 10 - 20 miles wide and has a population of about 90,000 persons. The altitude gradually increases from about 1,500 to about 2,000 feet. Annual rainfall ranges from an average of about 100 inches in the north to 30 inches in the center and 60 inches in the south, most of it falling between November and May. In the wet northern part soils consist mainly of heavy clay; rainfed rice predominates on mostly impermeable clays and some subsistence maize and cassava are grown on better drained fields. In the dryer central and southern parts soils are lighter and the main crops are cassava, groundnuts, cotton and maize. The Lake shore area is cut across by the beds of numerous wet season rivers flowing down from the escarpment. Dry season river flow is limited to the wet north and the most southern part of the Lake shore but there is little opportunity for economic storage of the wildly fluctuating river flows. Besides, the streams carry large amounts of silt which is further aggravated by denudation of the catchment areas. The prospects for irrigation development are therefore not so good as they were thought to be a few years ago.

3.04 The remaining part of Karonga consists of a steep escarpment which stretches along the entire western border of the district. Rainfall averages

up to 60 inches and the natural vegetation is mainly *Brachystegia* woodland. A small number of about 5,000 persons make their living on the escarpment, mainly by practicing slash and burn techniques which reduce the amount of natural vegetation.

3.05 Towards the northwest the escarpment extends into the Misuku hills in Chitipa district where altitudes reach more than 6,000 feet. Some 16,500 persons live in this area; they grow maize, millet, cassava, beans, peas and sweet potatoes for subsistence, and about one third of them grow some arabica coffee for cash. The annual rainfall varies between 40 and 60 inches and permanent cropping is more commonly practiced than in the Karonga part of the escarpment.

3.06 The largest part of Chitipa district consists of a sandy plateau along the Zambian border and large marshy clay valleys (locally called dambos) between the plateau and the hills in the northeast and south. Only about 56,000 persons were living in the Chitipa plains in 1974 and there exists considerable room for expansion. The annual rainfall averages 45 inches, fairly evenly spread over the period December to April, and reaches up to 60 inches in the most northern part of the district. The main crops are maize, groundnuts, beans, cassava, sorghum, sweet potatoes and millet, which are mostly grown for subsistence.

3.07 Cattle. In 1975, the cattle populations were estimated at 32,000 for Chitipa and 38,000 for Karonga, a total of 70,000 head. It is believed that productivity has improved recently following the animal health facilities provided by the first project but it is very difficult to make a precise assessment because of continuous cattle movements between Malawi, Zambia and Tanzania. The official statistics indicate a zero growth rate between 1965 and 1973 and an annual offtake of about 11.5% for the two districts.

National Rural Development Program (Annex 7)

3.08 The Project would provide for preliminary investments for NRDP in three development areas in different parts of Malawi. Criteria for the selection of the three NRDP sub-project areas include amongst others: high, but largely undeveloped agricultural potential; considerable initiative by the local farming community; ready accessibility of the area and some existing infrastructure; and maintaining an even balance in providing development assistance to all Regions. The selected areas are North-West Mzimba in the Northern Region, Thiwi-Lifidzi in the Central Region and Kawinga in the Southern Region.

3.09 The N.W. Mzimba sub-project is located west of the mainroad Mzimba-Rumphi and has a gross area of 670 square miles with an estimated population of 51,180 or 75 persons per square mile. Maize is the staple food crop and other food crops include sorghum, groundnuts, beans and cowpeas. About 40% of the farmers also grow tobacco. The second sub-project, Thiwi-Lifidzi, is located between the Mozambique border and the Lilongwe Land Development Program area. The gross area is 380 square miles with a population of about 130,000 or 340 per square mile, about twice the national average. As a result the area is more intensively cultivated than the other two proposed

sub-projects and all arable land is thought to be under cultivation. Major crops include maize, groundnuts, beans and tobacco. The third NRDP sub-project, Kawinga, is located north of Lake Chilwa on Malawi's eastern border with Mozambique. The gross area is 740 square miles and its population is estimated at about 100,000 persons or 140 per square mile. It comprises two ecologically different areas: a low rainfall maize, groundnut, cotton, tobacco economy in the north and a wetter area in the south around Lake Chilwa where rice, cassava and cattle raising are the main activities.

3.10 All three development areas have a good potential for increased production, mainly through more intensive cultivation methods and in some parts also through opening up of unused land (N. W. Mzimba, southern Kawinga). In all areas there has been a favorable response by the farmers towards pilot development activities - especially in Mzimba and Thiwi-Lifidzi. Additional survey work and farm-scale testing of possible improvements is needed to prepare sound crop and livestock development plans.

IV. THE PROJECT

A. General Description

4.01. The Project would, over four years (1976/77 - 1979/80), continue to support the development of the agricultural production potential of Karonga and Chitipa districts mainly through further strengthening of extension services and the distribution of farm inputs on credit, and would also make some further improvements to the social infrastructure of the two districts. The Project would also, over two years, support the preparation of the National Rural Development Program through strengthening of essential services in MANR and through preliminary investments, mainly in staff housing, in three selected development areas. Finally the Project would improve the facilities of the Malawi Lake Service through the rehabilitation of the Chipoka terminal. The Project would specifically provide for:

Karonga and Chitipa Districts

- (a) continuation and expansion of extension, animal husbandry and land husbandry services, and construction of housing for new staff and training and office facilities;
- (b) continuation and expansion of seasonal and medium term credit for farm inputs;
- (c) continuation and expansion of agricultural and hydrological research;
- (d) construction of additional boreholes and construction or improvement of rural roads, minor bridges, culverts and drifts;

- (e) construction of additional markets, input stores and small input sheds;
- (f) expansion and improvement of health facilities;
- (g) continued Project evaluation;

National Rural Development Program

- (h) strengthening of MANR's land husbandry, agro-economic survey, research, evaluation and accounting services and establishment of a road construction unit;
- (i) construction of staff housing, office facilities and stores and other necessary infrastructure, followed by the recruitment of additional extension, land husbandry and research staff in the development areas N.W. Mzimba, Thiwi-Lifidzi and Kawinga; and

Lake Transport

- (j) repair and expansion of berthing and associated facilities at the Chipoka Lake terminal.

In Karonga and Chitipa districts the Project would be implemented by the existing KRDP management unit under the general direction of MANR. The Director of Extension and Training in MANR would be responsible for the NRDP component, the Ministry of Health for the health component, ADMARC for the construction of crop markets and input stores, and Malawi Railways Limited, which owns and operates the Lake Service, would carry out the improvements to the Chipoka Lake terminal.

B. Detailed Features

Karonga and Chitipa Districts

4.02 Crop Development Targets (Annex 1, Tables 1 and 2). Under the Project improved crop husbandry techniques, including the use of fertilizer, improved seeds and insecticides, are expected to be practiced in the following areas at subsequent stages of development (acres):

	Before Start of Phase II Project (Year 0)	End of Phase II Project (Year 4)	At Full Development Year	Acres
<u>Karonga</u>				
Rainfed Rice	5,000	11,000	4	11,000
Dryland Crops	3,375	9,375	5	10,500
<u>Chitipa</u>				
Handcultivated Crops	900	6,300	9	16,200
Oxen-cultivated Crops	700	2,800	9	6,400

4.03 Extension and Training (Annexes 1 and 6). Over the next 20 years the Government intends to increase the number of extension workers in the country as a whole to the level of one field assistant for about 500 farmers. The Project would provide for a gradual increase in Karonga and Chitipa from the present level of one field assistant for every 850 farmers to one for about every 575-600 farmers by the end of the Project. The number of development assistants, working as demonstrators in cotton and rice (Karonga), coffee (Chitipa) and for the training of work-oxen (both districts), would also be increased. The following summarizes the existing and future staffing:

	<u>Karonga</u>			<u>Chitipa</u>	
	<u>Prior to Phase I</u>	<u>1975</u>	<u>End of Phase II</u>	<u>1975</u>	<u>End of Phase II</u>
Farm Families	19,500	21,000	22,750	17,000	18,500
Senior Extension Staff	7	14	18	4	13
Field Assistants	15	25	38	20	32
Development Assistants	20	30	40	9	13
Ratio Farm Families/ Field Assistants	1,200/1	850/1	600/1	850/1	575/1

Overall performance of existing extension staff in Karonga and Chitipa is generally good. Two existing rural day training centers for farmers in Chitipa would be upgraded to residential training centers and one new day training center would be built. Karonga already has one residential training center and two day centers and does not need additional facilities. Besides providing farmer training courses--for both men and women--the centers would also be used for in-service courses for staff. An additional extension aid van would also be acquired and operated by the Project.

4.04 Animal Husbandry and Veterinary Services (Annex 2). Various activities started under the first project will continue and be expanded. Two more dip tanks would be built in addition to the 19 old ones and the 22 constructed under Phase I. The Project would make full use of the existing livestock center in Karonga and the new center, presently under construction in Chitipa under the first project, to demonstrate the advantages of improved breeding stock and better animal nutrition. Before the start of the first phase project there were 25 animal husbandry and veterinary assistants in the two districts and an additional 12 posts were created during the first project; no further increases are provided for under this Project.

4.05 Land Husbandry Services (Annex 1). The land husbandry section would continue to assist the farmers with the layout or realignment of water control bunds in Karonga's rainfed rice areas and with the layout of farms based on catchments, both in Karonga and Chitipa. The section would also mark road alignments for people wishing to construct feeder roads on a self-help basis. During the last two years of the Project the staff of the land husbandry section would be transferred to the extension services which would continue to provide routine land husbandry services where needed.

4.06 Credit (Annex 3). The Project would provide for an expansion of the operations of the credit fund which started in 1972/73 in Karonga and in 1975/76 in Chitipa. The incremental volumes of seasonal farm inputs to be supplied on credit under this Project are estimated at 1,225 m ton fertilizer, 155 sh ton maize, groundnut and rice seeds and insecticides for 2,000 acres of cotton. Medium-term credit would be provided for about 425 pairs of work-oxen, 340 ox-carts, 750 ploughs and chains, 265 ridgers and 600 cotton sprayers. Depending on the conclusions and recommendations of the proposed coffee study (paragraph 4.13 and Annex 1) inputs may also be made available on credit for the improvement of coffee growing in Chitipa district. The organizational aspects of credit are discussed in Chapter V.

4.07 Research (Annex 1). The Project would provide for the continuation of crop research at the existing station near Karonga town and at the new station presently under construction at Lufita in Chitipa. Research programs would be determined in consultation with other field sections of the Project and more emphasis would be given to Project specific research subjects. In close collaboration with the extension services a program of farm scale tests of possible improvements for each of the main crops would be initiated in all extension sectors. The hydrology section would continue to collect relevant data on rainfall, streamflows, evapo-transpiration, and sub-surface water flows, which would be helpful in solving short-term problems such as design changes for bridges and culverts, sowing dates for crops, and the climatic suitability of an area for a new crop. Information, thus acquired, is also necessary for a better understanding of the irrigation potential of the Karonga Lake shore plain.

4.08 Boreholes. Village water supplies would be improved in areas where adequate sources are lacking, by drilling 40 boreholes in each district, so increasing the number of boreholes in Karonga from 94 to 134 and in Chitipa from 27 to 67. Some of the boreholes in Chitipa would be drilled in areas which, although fertile, are at present not cultivated due to water shortage.

4.09 Staff Houses, Offices and Roads. The Project would provide for the construction of a total of 74 houses for new staff, of which 15 would be in Karonga (in addition to the 110 houses built under the first project) and 59 in Chitipa. Office accommodation would also be built. The standards of construction adopted for the first project were higher than necessary and experience in the Lilongwe Land Development Program (LLDP) has shown that adequate housing can be provided by adopting simpler designs. At negotiations it was agreed that the Government would ensure that the design standards would be satisfactory to the Bank. The Project would also provide for upgrading of about 90 miles of feeder roads, of which 80 miles in Chitipa. Other essential roads would be improved so as to provide all weather access to the input stores. Some 70 bridges, 20 culverts and two drifts would also be constructed or repaired.

4.10 Crop Markets and Input Stores. ADMARC would construct and operate six crop produce market complexes in Karonga, in addition to the three existing ones, and three in Chitipa where at present only one such facility exists. Each complex would consist of a 280-ton input store, a market building and staff housing. ADMARC would also construct eight small input sheds in isolated areas of Chitipa district.

4.11 Health Facilities (Annex 5). The Project would provide for some further essential improvements to the health services in Karonga and Chitipa. These include the construction of three new maternity wards in Karonga, two maternity wards and seven health posts in Chitipa, staff houses and some boreholes in areas where fresh water is lacking. The Project would also finance the operating costs of the new facilities, which include personal emoluments, drugs and transport.

4.12 Evaluation. Continued support would be provided for the evaluation unit established under the first project and which carried out a first program of field surveys during the 1974/75 season. The unit would collect data partly through field surveys, particularly on crop acreages and production, and partly from other sections of the Project, for example on inputs issued to the farmers and marketing of crops. The Government has recently established a position for an evaluation officer in the economic planning section of MANR who would coordinate the activities of the evaluation units operating in the various agricultural development projects to ensure that similar methodologies are adopted throughout the country.

National Rural Development Program (Annex 7)

4.13 Central Services of MANR. In order to increase the Ministry's capacity to prepare and implement future investment phases of NRDP this Project would over two years provide for an expansion of the central services listed below.

- (i) The land husbandry section would be responsible for land resource inventories in proposed NRDP sub-projects. The unit would be strengthened by three additional staff with supporting facilities including housing, and the Project would also

finance the costs of another three staff, initially provided for a period of one year under the third phase of LLDP.

- (ii) The agro-economic survey unit would collect demographic, economic and agricultural baseline data in the proposed sub-projects and would be strengthened by three additional staff and supporting facilities. The Project would continue to finance another four staff initially provided under the third phase of LLDP.
- (iii) Six new agricultural research staff would be provided to conduct crop experiments in six future NRDP sub-projects in order to determine optimum input packages.
- (iv) A new evaluation unit, comprising 15 staff with supporting facilities, would initially be established in MANR's existing Regional headquarters at Mzuzu in the Northern Region. The unit would be responsible for monitoring progress under the Mzimba NRDP sub-project and would probably merge with the existing KRDP unit at a later stage.
- (v) The accounting services of MANR's headquarters would be strengthened by 16 new staff of which nine would eventually be transferred to the NRDP sub-projects following training at headquarters. The Project would also provide for continued financing of a financial controller, presently an ADS staff member whose costs are till now shared by the three IDA financed agricultural projects (LLDP, SVADP and KRDP), and for a systems analyst/programmer to computerize farm credit accounts.
- (vi) In the absence of a rural road construction unit in the Ministry of Works, MANR would also establish and operate a road construction unit similar to the units established in the major ongoing projects. The unit would be responsible for the construction and upgrading of rural roads in NRDP sub-projects. The Project would provide for the initial equipment and for a specialist to manage the unit.
- (vii) Finally, funds would be provided for ad hoc consultancies on special subjects which are relevant for the implementation of the Project. This would include a study of the development potential of Malawi's smallholder coffee industry by a coffee agronomist and an economist, and may also include specialist advice on the organization of a credit institution, manpower planning and the preparation of detailed NRDP sub-projects. At negotiations it was agreed that the Government would employ consultants whose qualifications, experience and terms and conditions of employment would be satisfactory to the Bank.

4.14 NRDP Sub-projects. The Project would over two years provide for preliminary investments in three development areas which the Government has selected as the first NRDP sub-projects. In North-West Mzimba (Northern

Region) and in Thiwi-Lifidzi (Central Region) respectively 19 and 33 houses for additional extension, land husbandry and agricultural research staff would be constructed. During the first year the Project would provide for a technical officer for each area, who would be responsible for Project implementation, while other staff would be recruited in the second Project year. The Project would further provide for the construction of office accommodation, rural training centers (one in Mzimba, two in Thiwi-Lifidzi), boreholes (20 in Mzimba, 16 in Thiwi-Lifidzi), input stores (three in Mzimba, two in Thiwi-Lifidzi), two bridges and some additional health facilities in Mzimba, and about 50 miles of roads in Thiwi-Lifidzi. The distribution of farm inputs on credit, such as fertilizer, seeds and tools, would commence on a small scale during the second Project year. Developments in a third area, Kawinga (Southern Region), would follow the same pattern but commence a year later than in the other two areas. The Project would provide for the construction of 28 staff houses, office accommodation, two training centers, ten boreholes, and three input stores, and for the recruitment of a chief technical officer during the second Project year. Simultaneously land resource and agro-economic surveys would be completed or updated in each of the three development areas and it was agreed during negotiations that detailed development plans would be submitted to the Bank before September 30, 1977.

4.15 Since the level of staffing for the NRDP preliminary investment phase, provided for under this Project, is essential for a successful preparation and implementation of NRDP, Government agreed at negotiations that no significant variations of staff positions would be made without consulting the Bank. No disbursements against the NRDP component would be made before the additional staff positions, as specified in Annex 7, Appendix 1, are established.

4.16 Lake Transport (Annex 13). The rehabilitation and expansion of the Malawi Lake Service is necessary for the accommodation of the increased traffic resulting from this Project and, in addition, other existing traffic demands. Under the first project, a jetty and associated structures were constructed at Chilumba in Karonga district but similar facilities at the existing southern terminal, Chipoka, which were also included in the earlier project, could not be constructed with the funds available. The need for the improvements to the Chipoka terminal is now more pressing than four years ago and the Project would therefore provide for the construction of berthing facilities and associated structures, including cargo handling equipment, at Chipoka. The Project also provides for the refitting of the motor vessel Mpsa to increase its bulk petroleum carrying capacity. The failure of the Lake Service to meet its operating costs, even excluding depreciation, suggests that tariffs are too low. To avoid a cross-subsidization of the Lake Service by the Railways, it was agreed at negotiations that the Government would establish Lake Service tariffs which would generate sufficient revenue to cover operating costs plus depreciation or debt service, whichever is greater.

4.17 Environmental Effect. The Project would have no adverse impact on the environment in the areas concerned. It would improve living conditions through the construction of potable water sources and the construction and operation of additional public health facilities.

C. Project Cost Estimates (Annex 8)

4.18 Total Project cost including contingencies is estimated at MK 10.9 million (US\$12.1 million) and the foreign exchange component is estimated at 52%. Detailed cost estimates are as follows:

	----- MK '000 -----			----- US\$ '000 -----			Foreign Exchange %
	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	<u>Local</u>	<u>Foreign</u>	<u>Total</u>	
<u>Karonga and Chitipa</u>							
Extension	417	302	719	463	336	799	42
Land Husbandry	90	53	143	100	59	159	37
Livestock	157	105	262	174	117	291	40
Construction Unit	368	368	736	409	409	818	50
Research	119	89	208	132	99	231	43
Hydrology	64	72	136	71	80	151	53
Mechanical Maintenance	47	122	169	52	136	188	72
Finance (Accounting Services)	344	281	625	382	313	695	45
On-farm Credit	26	147	173	29	163	192	85
Evaluation	100	81	181	111	90	201	45
Management Unit	148	107	255	164	199	283	42
ADMARC	326	140	466	362	156	518	30
Health	<u>235</u>	<u>164</u>	<u>399</u>	<u>261</u>	<u>182</u>	<u>443</u>	<u>41</u>
Subtotal	2,441	2,031	4,472	2,710	2,259	4,969	43
<u>NRDP</u>							
Central Services MANR	428	760	1,188	476	844	1,320	64
N.W. Mzimba	256	202	458	285	244	509	44
Thiwi-Lifidzi	248	145	393	276	161	437	37
Kawinga	<u>154</u>	<u>83</u>	<u>237</u>	<u>171</u>	<u>92</u>	<u>263</u>	<u>35</u>
Subtotal	1,086	1,190	2,276	1,208	1,321	2,529	52
<u>Lake Transport</u>	430	1,106	1,536	478	1,229	1,707	72
Base Cost	3,957	4,327	8,284	4,396	4,809	9,205	52
Physical Contingencies	259	281	540	288	312	600	52
Price Contingencies	<u>988</u>	<u>1,071</u>	<u>2,059</u>	<u>1,098</u>	<u>1,190</u>	<u>2,288</u>	<u>52</u>
Project Cost	<u>5,204</u>	<u>5,679</u>	<u>10,883</u>	<u>5,782</u>	<u>6,311</u>	<u>12,093</u>	<u>52</u>

Costs have been estimated at April 1976 prices and include capital and incremental operating costs, and the additional funds needed to operate the

Project's credit fund. ^{1/} The Project costs also include a decreasing proportion of the operating costs of investments made under the first project (e.g. staff and supporting facilities, dip tanks, livestock demonstration center, Lufira irrigation scheme). The balance of these costs would be financed by Government through annual budget allocations (details are at Annex 8, Appendix 1). A physical contingency of 10% has been allowed on the Lake Transport component and 5% on all other costs. Price contingencies have been calculated at the following rates (percentages):

	<u>1976/77</u>	<u>1977/78</u>	<u>1978/79</u>	<u>1979/80</u>
Vehicles, Equipment and Operating Cost	9	8	8	8
Civil Works	13	12	12	12
Wages and Salaries	9	8	8	8

Since the Government is executing the Project no taxes or duties are levied except for the taxes on local salaries which are insignificant.

D. Financing

4.19 The financing of Project costs would be shared in the following amounts and proportions:

	<u>MK (Million)</u>	<u>US\$ (Million)</u>	<u>% of Total Cost</u>
IBRD (Third Window)	8.3	9.2	75
ADMARC	0.7	0.8	7
Government	<u>1.9</u>	<u>2.1</u>	<u>18</u>
Total	10.9	12.1	100

The proposed Bank Loan of US\$9.2 million would be on standard Third Window terms to Government. It would finance the foreign exchange costs (US\$6.4 million) and about 48% of local costs, or 75% of total Project costs. ADMARC's contribution would be for the construction of input stores, markets and staff housing, and includes a proportionate share of the total provision for contingencies.

E. Procurement

4.20 During negotiations it was agreed that vehicles, machinery and equipment (US\$1.2 million) in orders exceeding US\$50,000 would be procured by

^{1/} Since the farmers would start to make small down-payments on both recurrent and incremental seasonal inputs the additional funds needed would represent only about 60% of the total value of the incremental inputs (Annex 3).

international competitive bidding in accordance with Bank guidelines; orders would be bulked whenever possible. Procurement of farm inputs and drugs (US\$0.3 million) would be subject to competitive bidding advertised locally, since foreign suppliers are well represented in the country. Construction of staff housing, offices, roads and bridges, and health facilities in Karonga and Chitipa districts (US\$1.0 million) would be undertaken by force account by the Ministry of Works and by KRDP's construction unit. Boreholes (US\$0.3 million) would be constructed by the Geological Survey Department of MANR; markets and input stores (US\$0.6 million) by ADMARC. Civil works under the NRDP component (US\$0.7 million) would be undertaken by force account by the Ministry of Works. The construction and upgrading of rural roads (US\$0.2 million) under the NRDP component would be undertaken by force account by MANR. The contract for construction of the port facilities at Chipoka (US\$1.4 million) would be under international competitive bidding in accordance with Bank guidelines; a margin of preference of 7-1/2% would be granted to domestic contractors.

F. Disbursement

4.21 Disbursement of funds from the Loan account would be on the following basis:

- (a) 75% of total costs for civil works (other than marketing facilities to be constructed by ADMARC);
- (b) 100% of foreign exchange costs or 75% of local costs for vehicles and equipment; and
- (c) 75% of operating costs, including wages and salaries.

Details of (a), (b) and (c) are in Annexes 3, 8 and 13. Disbursement against (a) and (b) would be fully documented. Disbursement against (c) would be made against appropriate certificates of expenditure certified for KRDP, including its health component, by the Project manager, and for NRDP by MANR's Director of Extension and Training. For the health component under NRDP the Ministry of Health would prepare claims whereas expenditures under the Lake Transport component would be prepared by Malawi Railways. The documentation for unsupported claims would be retained by the executing agency and would be available for inspection by the Bank during the course of a supervision mission. During negotiations it was agreed that no disbursement under the NRDP component would be made until the condition set out in paragraph 4.15 is fulfilled. Any funds remaining in the Loan account at the end of the Project would be reallocated with the approval of the Bank.

G. Accounts and Audits

4.22 Accounts, which would reflect expenditures on the various Project components, would be kept by KRDP, MANR, Ministry of Health, ADMARC and Malawi

Railways Limited. The full accounts of KRDP and ADMARC, the accounts of the Lake Service branch of Malawi Railways Limited and the Project related accounts of MANR and the Ministry of Health would be audited by independent auditors, acceptable to the Bank, and would be submitted to the Bank within six months of the end of the fiscal year. Agreement on the above was reached during negotiations.

V. ORGANIZATION AND MANAGEMENT

General

5.01 The Ministry of Agriculture and Natural Resources would have overall responsibility for implementing the Project, apart from the health component, which would be the responsibility of the Ministry of Health, the construction of crop markets and input stores, which would be the responsibility of ADMARC and the Lake Transport component, which would be administered by the Ministry of Transport and Communications through Malawi Railways Limited. The present organizational structure of MANR is not geared to the changing needs associated with the future implementation of NRDP and the Government is now considering proposals for modifications (IBRD chart 15652). At present all four major agricultural development projects (LLDP, SVADP, KRDP and CRLDP) are administered by project management units which report to the Permanent Secretary through the Projects Administration of MANR's Planning Unit, whereas the remainder of the country is administered by three Regional Agricultural Offices (Mzuzu, Lilongwe and Blantyre) which report to the Director of MANR's Extension and Training Department. Under the proposed reorganization the country would be progressively divided into probably ten agricultural regions, each with its own management unit, which would report to the Director of Extension and Training, whose responsibilities would be expanded. The management units of the four major projects and the three existing, but strengthened, Regional Agricultural Offices, would together constitute the first seven new-style regional management units. The Regional Offices at Mzuzu and Blantyre would be sub-divided at a later date.

Karonga and Chitipa

5.02 The existing KRDP Project management unit would assume responsibility for all agricultural services in the Karonga and Chitipa districts and, pending the introduction of the new organizational structure of MANR, the Project manager would continue to report to the Permanent Secretary through MANR's Planning Unit. No major alterations are envisaged during Phase II in the organizational structure of the KRDP management unit; the main change would be the inclusion in the Project of existing MANR staff in Chitipa. The Project would continue to be administered through five divisions, i.e. agricultural services (including animal husbandry), research, construction, mechanical maintenance and finance; the evaluation unit would continue to monitor the Project's progress (chart IBRD 15653). Since 1975 the post of Project manager is held by a Malawian but a number of specialist posts would

continue to be occupied for a period by expatriates in view of the scarcity of qualified nationals; their main duty would be to provide in-post training for Malawian nationals. The United Kingdom has agreed with the Government that under the Overseas Services Aid Scheme (OSAS) seven specialists would be made available to KRDP in 1976/77, six in 1977/78, and five in 1978/79, which is expected to match the Project's requirements. At negotiations it was agreed that the Government would consult the Bank on any new appointment to the post of Project manager.

National Rural Development Program

5.03 The Director of Extension and Training in MANR, who is in charge of all agricultural extension in Malawi except for the ongoing major projects, would also be responsible for the implementation of NRDP. He would be assisted by a coordinator who would be responsible for day-to-day management of NRDP; he would be recruited against an existing but presently vacant post of principal agricultural officer at headquarters. At negotiations it was agreed that the Government would consult the Bank on appointments to this post. As at present the Director of Extension and Training would delegate executive responsibility to the Regional Agricultural Officers (RAO), who in turn reach the field level staff through the District Agricultural Officers (DAO). For each of the three NRDP sub-projects a senior technical officer (STO) level project supervisor would be recruited, who would be responsible for all field operations in his area and report to the DAO. NRDP would thus be implemented through the existing, but strengthened, MANR organization rather than by a new structure as established under the earlier projects.

5.04 A liaison committee would be established to assure proper coordination of various NRDP components and activities. The committee would be chaired by MANR's Permanent Secretary, or his representative, and consist of senior representatives of the Office of the President, the Treasury, the Ministries of Works and Supplies, Community Development and Health, ADMARC, as well as department heads of MANR. On the field level past experience has clearly shown that farmers groups can play an important role in matters such as purchase of inputs, farm credit and demonstration of new techniques. The field extension workers, supervised by a technical officer and assisted by specialist staff (credit, crops, animal husbandry), would therefore encourage the establishment of farmers groups wherever possible.

5.05 The availability of qualified staff is the limiting factor for the rate of expansion of future agricultural development activities, particularly for NRDP. Since a clear picture of future needs and availability of staff of various levels is lacking it was agreed during negotiations that MANR, assisted by consultants if necessary, would undertake a thorough review of the manpower situation during the next decade. The results would be discussed with the Bank before June 30, 1977. It was also agreed at negotiations that the levels of MANR's agricultural staff in Karonga and Chitipa districts would be substantially as detailed in Annex 8, Appendix 2.

Credit Arrangements (Annex 3)

5.06 In the past, agricultural credit to smallholders has mainly been provided by the major rural development projects through their respective credit funds but the planned expansion of credit activities on a national scale under NRDP has made it necessary to review both the organization of smallholder credit and its policies. A committee in MANR is now preparing proposals for suitable credit arrangements and is expected to complete its assignment in the course of 1976. It is expected that the following points would be reflected in the final proposals:

- (i) farmers would be encouraged to pay cash for seasonal inputs, for example by allowing discounts for bulk sales of fertilizers;
- (ii) where possible, credit would be given to farmers groups, rather than to individuals, in order to reduce the administrative burden and to lower the costs involved;
- (iii) the credit charges for the different programs - seasonal credit for farmers groups and for individuals and medium-term credit for individual farmers only - would be increased progressively to levels which would more closely reflect the real interest and administrative costs involved; and
- (iv) a system of down payments would be adopted for all types of credit schemes.

At negotiations it was agreed that the final proposals for future credit arrangements would be discussed with the Bank before June 30, 1977.

VI. PRODUCTION, MARKETING, FARMERS' BENEFITS AND EFFECTS ON GOVERNMENT BUDGET

A. Production (Annex 1)

Yields

6.01 In Karonga some 3,000 farmers would increase their rainfed rice production from an average 1,600 lb to about 2,400 lb per acre during the four year Project period by using fertilizers and improved seeds and through improved water control measures. Dryland production of maize, groundnuts and cotton in Karonga would be increased over a seven year period from the start of the second Phase Project by some 1,500 farmers. Maize yields would increase from 800 lb to 2,200 lb per acre through the use of fertilizers and composite or synthetic seeds; cotton yields would increase from 300 lb to 800 lb per acre, mainly through spraying against insects, and groundnut yields would rise from 300 lb to 450 lb per acre by using improved seeds and better husbandry. The estimates of incremental

yields are, on the average, about 15-20% lower than those assumed earlier, both in the appraisal report of the first project and in Government's preparation report for this Project. The downward adjustments are based on yields actually achieved in the Project area during the past two years.

6.02 In Chitipa some 5,100 farmers would increase the production of maize and groundnuts over a nine year period. The expected yield increases are slightly higher than in Karonga because the average rainfall is somewhat better. The yield of composite or synthetic maize varieties is expected to be about 2,400 lb per acre and Chalimbana groundnuts would yield about 500 lb per acre. An estimated 1,400 farmers would increase the production of maize and groundnuts through an expansion of the cultivated acreage by using work oxen for land preparation.

Production

6.03 The incremental crop production resulting from the Phase I and II Projects respectively is summarized below (sh ton):

	<u>Phase I 1/</u>	<u>Phase II 2/</u>	<u>Total</u>
Rice (paddy)	3,575	2,400	5,975
Groundnuts	240	1,200	1,440
Maize <u>/3</u>	535	9,865	10,400
Cotton	735	585	1,320

1/ Karonga only; full benefits of Phase I investments to be reached two years (dryland crops) or three years (irrigated rice) after completion.

2/ Full development to be reached in year 4 (rainfed rice), year 5 (dryland crops Karonga) or year 9 (Chitipa).

3/ Corrected for decrease in cassava production; actual incremental maize production would be slightly higher.

B. Markets and Prices (Annex 4)

6.04 Participating farmers would sell all incremental cotton and at least 90% of the incremental rice and groundnut production. Future maize sales are more difficult to estimate since there exists an unquantified but probably important unsatisfied demand in Karonga and Chitipa districts. The best estimate is that the first 4,000 sh ton of the incremental production would be consumed locally, either by the producers or by other residents of the two districts, and that the surplus would be sold outside

the area. ADMARC would continue to offer for all crops guaranteed minimum prices and no problems are anticipated in marketing any of the commodities involved. In the last few years ADMARC'S official produce prices to the growers, especially for maize, have tended to lag behind the steep rise in fertilizer costs and also behind prices paid in neighboring countries, but the substantial increases which were announced for the 1975/76 growing season are expected to be high enough to maintain the farmers' incentives. Since ADMARC's prices are uniform for the whole country and the isolated Karonga and Chitipa districts have traditionally many informal commercial ties with neighboring Zambia and Tanzania it is likely that a significant part of the agricultural production would continue to be marketed outside the official ADMARC channels.

C. Farmers' Benefits (Annex 1 and 11)

6.05 The number of farm families who are expected to benefit from the Phase I (Karonga only) and II Projects are summarized below (Annex 1, Tables 1 and 2):

		Total Number of Farm Families	1/	<u>Adopting Families</u> <u>Number</u> <u>Percentage</u>	
<u>Karonga Lake Shore</u>					
End of Phase I	- 1975/76	21,100		4,500	21
Full development	- 1982/83	25,100		9,000	36
<u>Chitipa Plain</u>					
Prior to Phase II	- 1975/76	12,800		300	2
Full Development	- 1984/85	16,000		5,400	34

1/ The population increase is estimated at 2.5% per annum.

There exists no satisfactory basis for these projections. In Government's preparation report the final adoption rate was estimated at 50% for both Karonga and Chitipa. Since this projection may be somewhat optimistic it has in this report been assumed that about one third of the total number of farm households would respond to the Project's extension efforts. No estimates have at this stage been made on the possible adoption by some 3,900 farm families living in the coffee growing Misuku hills in Chitipa, pending the findings of the recommended coffee study. Since extension services in the Misuku area would be improved as in other parts of Chitipa and inputs on credit for food crops would be available to these farmers, some response may be expected but no attempt has been made to quantify this.

6.06 Typical farm families would increase the net value of crop production as follows through adoption of improved husbandry methods (Annex 11):

	Without Project <u>MK</u>	With Project <u>MK</u>	<u>Increment</u>		
			<u>MK</u>	<u>US\$</u>	<u>Percentage</u>
<u>Karonga</u>					
4-Acre Farm with Rainfed Rice (2 acres)	166	214	48	55	28
4-Acre Dryland Crop Farm	64	115	51	58	79
<u>Chitipa</u>					
4-Acre Farm, Hand Cultivated	72	99	27	31	38
8-Acre Farm, Oxen-cultivated	72 <u>1/</u>	188	116	133	162

1/ Without Project: 4 acres, hand cultivated.

The official 1976 ADMARC crop prices were used in this calculation; the values are slightly different (higher in most cases) if international prices projected for 1980, are used (Annex 11, Tables 3-5). Incremental incomes would also be higher if farmers realize higher prices by selling their produce to local traders. Incremental incomes are likely to differ substantially, depending on the extent to which farmers adopt improved techniques. Incomes would also depend on the size of the farm, which is usually closely related to the number of household members. The estimates of the total production include subsistence but, as stated in paragraph 6.04, most of the increment would be sold for cash.

D. Effect on Government Budget (Annex 10)

6.07 The cash flow, presented in Annex 10, shows that the Government would not be able to recover on-going expenditures under this Project. After completion of the Project and excluding debt service, the annual cost to Government to maintain the level of extension and other services amounts to MK 0.6 million and stabilizes at MK 0.5 million from year 10 onwards, leading to a cumulative deficit of MK 11.1 million (US\$12.3 million) by year 20. Comparable figures, including debt service, average MK 0.8 million for years 5-9, stabilizing to MK 1.2 million in year 10 and the cumulative deficit by year 20 is projected to be MK 19.8 million (US\$22.0 million). In preparing the cash flow, ADMARC's profits on incremental marketable production have been included and also the increased revenues through improved Lake Transport services and the surplus generated by the credit fund. In the event that a part of the incremental production does not pass through ADMARC channels the deficit would be higher. No revenues arising out of the NRDP preinvestment

phase have been included. Possible farmers contributions to Government revenue through indirect taxes resulting from increased activities in the two northern districts are expected to be small and have not been taken into account either. The costs for continuing the services are normally covered from general budget allocations. However, in view of the Government's narrow revenue base, it is not clear whether the additional recurrent costs could be absorbed without some changes in policies, for example concerning pricing of agricultural produce or the taxation system. Therefore, and also because additional deficits may result from the implementation of future NRDP projects, it was agreed at negotiations that the Government would undertake a study, assisted by consultants if necessary, of the long term budgetary implications of all agricultural development projects. The results of the study would be discussed with the Bank before September 30, 1977.

VII. ECONOMIC BENEFITS AND JUSTIFICATION (Annexes 12 and 13)

7.01 The chief benefits of the Project would be increased production of rice, maize, groundnuts and cotton in Karonga and Chitipa districts. At full development, to be reached in year 5 in Karonga district and in year 9 in Chitipa, the value of the incremental production for the two Phases combined would be about MK 1.9 million (US\$2.2 million) per year of which about two thirds would result from developments to be initiated under the second Phase Project. In the livestock sector further increases in cattle productivity (beyond those generated by improved animal health facilities constructed under Phase I), are likely because demonstration work on the two livestock centers would continue but it is not possible to make estimates of the benefits because reliable data are lacking. The population of Karonga and Chitipa districts would benefit from improvements to the health facilities and from the construction of boreholes. The NRDP preinvestment phase, included in this Project, would increase MANR's capacity to prepare and administer rural development projects and would also establish basic staff facilities and infrastructure necessary for a speedy and effective implementation, in about two years time, of three NRDP sub-projects in areas with good potential for development. The construction of berthing facilities and associated structures at Chipoka would increase the capacity of the port, decrease ship turn around time, increase the productivity of cargo handling and reduce cargo damage.

7.02 Based on IBRD forecast prices, the internal economic return (IER) of the Karonga-Chitipa part of the Project is estimated at 14%. The research, health, evaluation and livestock components, representing about one third of the cost of this part of the Project, were not included in the calculations since their benefits cannot be quantified. The Lake Transport component has an IER of 18%. No economic rate of return can yet be calculated on the pre-investments under the NRDP component during the first two Project years. Appropriate proportions of these pre-investments would be included in the economic evaluation of the first full fledged NRDP project which is scheduled to be appraised in late 1977. The official exchange rate of the Malawi currency is believed to be a reasonable approximation of its true economic

value in view of the relatively low net effective protection. Therefore foreign exchange costs and benefits have been included at par values. Employment opportunities outside the Project are virtually non-existent and the Project itself makes limited demands on available family labour. A shadow price of zero for family labour has therefore been assumed in the economic analysis. If the cost of incremental family labour is assumed to be 25% of the daily wage rate the IER would be reduced from 14% to 13%. The aggregate IER for the whole Project is estimated at 16%.

7.03 The major risks facing the Project are that adoption rates of improved crop husbandry methods and the increases of crop yields would be lower than forecast. The IER would decrease to 8% when only 90% of the estimated benefits materialize and a further reduction to 3% would occur if at the same time the costs would increase by 10%. Since conservative adoption rates and yield increases have been assumed it is equally probable that the adoption rates and the yields would be higher, thereby resulting in a higher than estimated economic return.

7.04 Information on actual per capita incomes in Karonga and Chitipa districts is fragmentary and incomplete. When valued at the official ADMARC prices the present annual net income from the production of crops, including subsistence, is about MK35-40 (US\$40-45) per capita for Karonga's rice growers and about MK 15-20 (US\$20) for Karonga's and Chitipa's dry-land farmers. Recent cash receipts for crops were, however, considerably higher because of unrecorded border sales, especially of groundnuts. Sales of cattle across the border make it difficult to estimate income farmers may have received from livestock activities. A significant number of households in Karonga district is engaged in fishing on Lake Malawi but no reliable information on income from this source is available. On balance it can be concluded, however, that present per capita incomes of the majority of the Project's beneficiaries does not exceed the absolute poverty level of US\$40. The Project would provide temporary additional employment in the construction sector for up to about 1,000 people and adopting farmers would on average work about 25-30% more days on their fields.

VIII. AGREEMENTS REACHED AND RECOMMENDATIONS

8.01 During negotiations agreements were reached on the following principal points:

- (a) the standards of construction for staff houses would be satisfactory to the Bank (paragraph 4.09);
- (b) Government would employ consultants, whose qualifications, experience, and terms and conditions of employment would be satisfactory to the Bank (paragraph 4.13);

- (c) Government would submit detailed development plans for the three NRDP sub-projects, N.W. Mzimba, Thiwi-Lifidzi and Kawinga, to the Bank before September 30, 1977 (paragraph 4.14);
- (d) no significant variations of additional staff positions for the NRDP preliminary investment phase would be made without consulting the Bank (paragraph 4.15);
- (e) Government would establish Lake Service tariffs which would generate sufficient revenue to cover the operating costs plus depreciation or debt service, whichever is greater (paragraph 4.16);
- (f) Government would consult with the Bank on new appointments to the posts of KRDP Project manager and NRDP coordinator (paragraph 5.02 and 5.03);
- (g) Government would undertake a review of MANR's manpower situation in the next decade to establish a feasible rate of expansion of future agricultural development activities; the results of the review would be discussed with the Bank before June 30, 1977 (paragraph 5.05);
- (h) the levels of MANR's agricultural staff in Karonga and Chitipa would be substantially as detailed in Annex 8, Appendix 2 (paragraph 5.05);
- (i) Governments final proposals for future credit arrangements, presently under preparation, would be discussed with the Bank before June 30, 1977 (paragraph 5.06); and
- (j) Government would undertake a study of the long term budgetary implications of all agricultural development projects; the results of the study would be discussed with the Bank before September 30, 1977 (paragraph 6.07).

8.02 During negotiations it was agreed that no disbursements against expenditures for the NRDP component would be made before Government establishes the additional staff positions specified in Annex 7, Appendix 1.

8.03 The Project is suitable for an IBRD (Third Window) Loan of US\$9.2 million to the Government of Malawi.

MALAWIKARONGA RURAL DEVELOPMENT PROJECT, PHASE IIAgricultural DevelopmentA. BackgroundIntroduction

1. This first section describes briefly the four main crop systems which are followed in Karonga and Chitipa districts and also summarizes the development started under KRDP, Phase I. Details on each of the major crops and their potential for improvement are given in the second section of this Annex. The final section contains an outline of present and recommended future research work.

Karonga Rice

2. Rice is by far the most important crop and source of cash income in the northern part of the Karonga Lake shore area. In 1972, no less than 20,000 acres, out of a total cultivated area of about 34,000 acres, involving some 11,000 farm households, were cropped with rainfed rice. Another 3,000 acres of rice, of which 850 irrigated, are grown in the most southern part of Karonga Lake shore. More than half of the total paddy production is sold by the farmers; ADMARC's purchases of paddy increased from about 4,000 sh ton in 1970/71 to 8,275 sh ton in 1974.

3. The first project provided for two irrigation schemes, one of 1,000 acres at Lufira and one of 500 acres at Wovwe, in addition to the two schemes which were built earlier in Hara and Wovwe with British aid. Because of technical problems and heavy cost overruns which occurred during the construction of the Lufira scheme the new irrigation scheme at Wovwe was dropped from the project. During the construction of the Lufira scheme it became clear that costly concrete lining of the two main canals was necessary to avoid excessive water losses. At the time of appraisal (October 1975) lining was completed for one canal and the second was to be lined during the final project year. Irrigation of the first part of the Lufira scheme was scheduled to start in early 1976. No further irrigation development is envisaged under this Project in view of the high costs.

4. The first project also provided for the improved layout of 6,000 acres of rainfed rice in northern Karonga. Demarcation of 5,000 acres is scheduled to be completed by the end of Phase I, and this is 1,000 acres short of the target, mainly because the project period was shortened by one year. Improvements consisted of boxed water control bunds demarcated by the Land Husbandry section and constructed by the farmers themselves. The section is also trying out the usefulness of contour bunds with a vertical distance of

4 inches to facilitate quick disposal of surplus rainstorm water and to retain some water as a safeguard against drought. At present most rice fields are laid out in north-south and east-west lines, parallel to the roads but if the trials prove successful the contour layout would be encouraged on a wider scale. This would involve the construction of masterbunds with a vertical spacing of 12 inches or a horizontal spacing of 100 yards by a motor grader while the intermediate bunds would be done by the farmers themselves. Where necessary natural drainage lines would also be improved.

5. Very little fertilizer was applied to rainfed rice before the first project but this has changed rapidly in the last few years; the project provided both fertilizer and seeds on credit. During the first season (1973/74) 142 m ton of fertilizer and 32 sh ton rice seed were distributed on credit to 1,043 farmers. The following season (1974/75) the amount of fertilizer increased to 216 m ton (despite the steep rise in fertilizer prices) and seed to 149 sh ton for a total of 2,467 farmers. Assuming application rates of 75 kg fertilizer and 60 lb seed per acre the acres involved can be estimated at about 2,900 ac with fertilizer and 4,950 with improved seeds. The Evaluation Section of the project found for the 1974/75 significant differences in yields: the average yields of "scheme" farmers was about 2,550 lb per acre and in three "non-scheme" areas the average yields varied between 1,100 and 1,650 lb per acre. This clearly demonstrates the immediate impact of the use of fertilizer and improved seeds on the production and it is expected that about half of all rainfed rice growers would follow this example by the end of the second Project.

Karonga Dryland Crops

6. Cassava and, to a lesser extent, maize are the staple foods in the southern half of the Karonga Lake shore while groundnuts are grown mainly, and cotton entirely, as cash crops. The cultivated area in southern Karonga was estimated at about 37,000 acres in 1972 involving some 8,200 families. A typical crop rotation pattern is as follows:

- (i) 25% pure stand maize, and 8% mixture of maize and groundnuts;
- (ii) 33% maize interplanted with cassava; and
- (iii) 33% second year cassava.

Other crops, such as cotton, sorghum, millet and pulses are also grown but their proportions in the overall cropping pattern are small. Intercropping is common in the most southern part of Karonga. ADMARC crop purchases were during the last few years virtually restricted to cotton; the quantities involved varied between 150 and 200 sh ton during the period 1970-1972 and increased to 247 sh ton in 1973 and 320 sh ton in 1974. In the past ADMARC also purchased significant amounts of groundnuts (365 sh ton in 1969) but in 1975 ADMARC managed to buy only a few bags. Almost all groundnuts were sold locally to traders because of higher prices.

7. One of the objectives of the first project was to consolidate the many scattered holdings into well-organized dryland crop schemes and to provide the farmers with extension advice and farm inputs, particularly fertilizer, seeds and insecticides, on credit. Plots, demarcated in the first few years, varied in size between four and eight acres but it was concluded that four acres is probably the maximum area that the average family can cultivate intensively by hand. By the end of the first phase project some 7,800 acres are expected to be demarcated. Distribution of inputs on credit was initially restricted to farmers in the consolidated schemes. Only 20 m ton fertilizer was distributed on credit for maize in 1974/75, compared with 19 m ton in the previous year. Over the same period the distribution of improved maize seed increased from three to seven sh ton and that of groundnut seed from 10 to 26 sh ton. In order to involve the maximum number of farmers, project management has recently started to make inputs available also for non-scheme farmers. Overall, the distribution of inputs is behind schedule.

8. On the basis of all inputs distributed in 1974/75 the combined improved area of maize, groundnuts and cotton must have been about 2,350 acres (of which about 1,000 acres cotton), whereas the revised appraisal estimate indicated 5,200 acres for that year. Undoubtedly the high fertilizer prices played an adverse role but even allowing for this the forecast was probably too optimistic. The proportions of the various crops envisaged in the cropping pattern (45% maize, 45% cotton and 10% groundnuts) have not materialized either. Too much emphasis was given to maize, which does not grow very well in the hot and dry central part of Karonga Lake shore, not enough attention was given to groundnuts which is an attractive crop if prices are good, and cassava was ignored and is still officially banned from the dryland crop schemes. In view of the importance of cassava in the traditional diet it was not surprising that farmers complained about this unfortunate regulation. In the present Project equal areas of maize, groundnuts, cotton and cassava have been assumed for the final cropping pattern. Some 3,500 farmers (about one third of the total) are expected to be involved in improved dryland cropping by the end of the Project.

9. The Evaluation Section of KRDP collected for the first time yield information during the 1974/75 season both on "scheme" and "non-scheme" farms. The results are interesting although they should be treated with caution: many "scheme" farmers have not yet used the input packages whereas some "non-scheme" farmers did actually obtain inputs on credit. The results are summarized below (in lb per acre):

	<u>Non-Scheme farms</u>	<u>Scheme farms</u>
Maize	475 - 1,150	1,810
Groundnuts (shelled)	385 - 455	605
Cotton	640	940

Chitipa Plains

10. In 1974 some 12,500 farm households cultivated about 45,000 acres of land in the Chitipa plains. There are important land reserves in the form of fallow land (143,000 acres) and uncultivated land (130,000 acres). The southern part of the plains is more undulating and has a larger proportion of unproductive land with a lower density of population than the north. About two thirds of the cultivated land is under maize and almost all of that is intercropped with pulses, groundnuts or cassava. Cassava is the second most important crop. Slash and burn growing techniques, locally called visoso, are common for the cultivation of millet.

11. Data on yields are very scarce and estimates on average maize yields vary between 600 and 1,000 lb per acre. In two dryland schemes, which were established with the very active participation of several hundreds of farmers, maize yields of about 3,500 lb per acre have been achieved with synthetic seed and up to 5,000 lb per acre with hybrid seed and a heavy application of 100 kg sulphate of ammonia and 100 kg of compound 20.20.0 fertilizer. Besides maize there is also a good potential for the production of more groundnuts, beans and livestock. There is room for both intensified production on existing farms and for increasing the cultivated area by using work-oxen for land cultivation. A good start has already been made with the use of work-oxen and several hundreds of them have by now been trained with the help of extension staff. Cultivation of new areas needs in many places to be preceded by the construction of boreholes or wells since sufficient household water and drinking water for cattle is lacking during the dry season.

Misuku Hills

12. The Misuku hills are located in northern Chitipa and are characterized by steep slopes, at an altitude mostly between 4,000 and 6,000 feet above sea level. In 1974 an estimated 3,700 families cultivated about 18,000 acres of land. The subsistence crops which are grown in the Misuku hills are similar to those cultivated in the plains, with the exception of Irish potatoes which are only grown in the high altitude areas. Small plots of coffee are kept as a cash crop by about one third of the farmers. The potential of the area, especially for improved coffee growing, is not clear and requires further investigations and, above all, farm scale testing of possible improvements. Besides coffee there may be some potential for beans, peas and livestock. Expansion of the cultivated area does not seem advisable in view of the risk of gully erosion, and a balanced extension effort seems needed to intensify the present farming system.

B. Crop Development

Rice

13. Varieties. In northern Karonga the variety Faya is commonly grown. This is an old, local indica type which is fairly well adapted to variable

conditions of excess or shortage of water. During prolonged rains Faya is known to be susceptible to seedling blast from which it may recover somewhat if the rains end in time. Shattering is a problem which is worsened by wide spacing leading to excessive tillering: the last tillers are still green when the first are ready for cutting. Faya is a long grain type 6.5-7 mm x 2.5-3 mm and may yield up to 6,000 lb per acre. The growing season from seed to seed is 150-160 days. KRDP's Evaluation Section observed in 1974/75 that Faya has a disease problem under rainfed farming conditions, especially in the southern part of north Karonga, where drought may worsen the effect. The disease is probably blast (*Piricularia oryzae*) but a regular check by a qualified plant pathologist is needed to detect other disease problems at an early stage. Reselection of Faya on blast resistance is undertaken by KRDP's Research Section. Selection of promising lines should be followed by early, area wide testing at 4-6 sites and by early rapid multiplication of seed. The finally selected line or a mixture of lines should be produced in a quantity of around 250 ton a year to enable all rainfed rice farmers to renew their seed every third year. Early bulking of promising varieties and mass bulking of finally chosen material should be speeded up and safeguarded against drought. This could be done by using the new irrigation facilities at Lufira over a yearly acreage of about 100 acres with up to 50 good contract farmers. The organization and supervision (field and seed inspection) of this task should be done by the KRDP Research Section until the Seed Services of ADMARC can be entrusted with it. Blast resistant material is especially needed when more fertilizer is used as the latter tends to increase blast susceptibility.

14. In southern Karonga the Blue Belle variety, a well-known American indica-japonica type with a fair yield potential of over 3,000 lb paddy per acre, is grown during dry as well as wet seasons in a growing period of 120-150 days. It produces extra long grain 7-7.5 mm x 3-3.5 mm. This variety seems to be more resistant to blast but is unsuitable for the tough conditions of rainfed production in north Karonga.

15. Seed and Sowing. Most Karonga rice growers use their own seed, except in the area of the first project where fresh seed, bought on credit, is widely being used. There is a wide range of sowing dates caused by the unpredictable rains of May-June. These rains threaten ripening rice sown in December-January, but in some years their absence damages the growth of rice sown in March-April. Vital period analysis over 20 years rainfall in north Karonga indicates as optimal sowing dates: Karonga: January; Mwenitete: January-February; and Songwe: February-March. Under irrigation, sowing dates are determined mainly by the need for dry harvest weather, i.e. around January and around June which leaves little time for cultivation when Faya with its rather long growing season is planted. The comparatively late sowing in north Karonga allows soil cultivation in December and January and makes it possible to get rid of the early flush of weeds before sowing. Most rice in north Karonga is sown directly in hills 8" x 8" (20 x 20 cm) apart

with 4-5 seeds per hill. This permits rapid weeding as well as fair ventilation of the crop which helps to suppress blast. Serious weed problems may develop where seeds are broadcasted.

16. Fertilizer. Research work of fairly long standing (6 years with 12 seasonal rice crops) indicates that for the time being only nitrogenous fertilizer is needed. This can be applied in one or two top-dressings, say 1 and 2.5 months after sowing. An average yield of 1,600 lb paddy per acre may be expected without fertilizer. With fertilizer yields would increase by about 500 lb paddy per acre for each additional 50 kg bag of sulphate of ammonia or CAN. It is assumed that the application on well controlled rainfed rice would be around 75 kg sulphate of ammonia which would result in a yield of about 2,400 lb per acre. On irrigated rice the application would be 150 kg of fertilizer and the yield 3,000 lb per acre.

17. Crop Protection. Early weeding in rice is important since the young, non-transplanted rice seedlings are sensitive to the competition of the mostly vigorous water weeds. Insect pests and rodents do not seem to cause much problems, at least not under traditional conditions, but a close watch is necessary under improved conditions. As noted above, there is a serious disease (probably blast) problem which must be remedied by regularly using fresh, disease resistant, seeds.

Maize

18. Varieties. The local seed varieties produce under normal dryland conditions rather small cobs with about one oz grain each. This gives a false impression of low yield potential because the same varieties grown on residual moisture in shallow holes 4' x 4' apart can produce strong plants and large cobs with an estimated 0.5 lb grain each, which corresponds to a yield of about 4,000 lb (20 bags) per acre. Even these heavy cobs are wrapped stiffly in their cob leaves protecting them against pests. Other advantages of the traditional maize variety are a hard seedcoat, which offers resistance against storage pests, and a taste which is appreciated by the farm families. Recently, synthetic and composite varieties have been introduced. Generally they have a higher yield potential and show a greater response to fertilizer but thorough testing of new varieties for drought tolerance, resistance to pests and acceptability of taste is necessary before they are recommended to replace the traditional varieties. Since the seeds of synthetics and composites need to be replaced only once in every three years the cost of these types of improved seeds is rather low, compared with the cost of hybrid seed which is far more expensive and needs to be renewed every year.

19. Seed and Sowing. Maize is always the first crop to be sown but planting is usually late because of late soil cultivation which only begins after the first rains have softened the soil to a depth of 6-8

inches. The efficiency of the early rains is low because the soil is still bare and compact, leading to run-off losses. The heat between the first rain storms further causes evaporation losses. Cultivation is often delayed until December-January and effective sowing till January or even February. Vital period analysis of monthly rainfall of Karonga and Chitipa data over periods varying from 7 to 39 years suggests that sowing within a month after the first rains should be recommended. Reports of the Evaluation Section for the 1974/75 season suggest a yield reduction of 1%, or 8 lb maize per acre, for every day's delay in sowing after the first heavy rains. Stooking the maize during the soft dough stage of the cobs would permit land cultivation for the next season before the soil becomes too dry and would also conserve most of the stalk's feeding value for dry season feeding of livestock. The field can then be ridged to allow soaking-in of the early rains. This would make it possible to plant at least a month earlier than at present. The Evaluation Section found in 1974/75 an average stand of 6,000 hills with 15,000 plants per acre which is too low to produce satisfactory yields as shown below:

5,000 plants	gave a yield of	550 lb per acre
15,000 plants	gave a yield of	1,000 lb per acre
25,000 plants	gave a yield of	1,400 lb per acre

The popular 3 x 3 x 3 planting (3 plants per hill, 3 ft. by 3 ft. apart) leads to 14,500 plants but an 80% stand has only 11,600 plants which on average yield 700 lb per acre. A stand of 20,000 plants per acre is recommended and filling in should start as soon as the seedlings are up. Thinning out and weeding should follow within two weeks.

20. Fertilizer. The use of one bag of compound 20.20.0 and one bag of 20% nitrogenous fertilizer sulphate of ammonia (or an acid soils calcium ammonium nitrate) on an improved variety can be expected to raise the yield from 800 lb per acre to 2200 lb in Karonga and to 2400 lb in Chitipa. At 1975/76 prices the gross value of the incremental production is about 1.8-2 times the total extra cost of seed and fertilizer which may be too low for rainfed farming. As the N-conversion percentage is already 55%, which is quite high for rainfed conditions, the possibility of reducing the amount of N is small. Phosphate could possibly be omitted which would reduce the fertilizer cost and increase the benefit/cost ratio to 2.1-2.4.

21. Plant Protection. Oral evidence suggests that weeding often starts 3-4 weeks after sowing "when there are enough weeds to make a good hoeing worth while." This suggests the existence of severe early weed competition to the young maize seedlings in their most sensitive stage. The harm is then already done and later weeds would not have much further direct effect. The message clearly is that weeding should start a week after sowing or filling in

and be repeated every two weeks till the crop is weed free and closes. Experience elsewhere has shown that early, swift and frequent weeding gives excellent results and reduces the total time spent on weeding. Maize is rather free from pests in most of the cases; only light insect pests and light rodents infestation are sometimes found but they have little effect on the yields. The storage pest situation is more serious. In October-November 1975, all farm maize stores which were inspected had weevils; usually one weevil per 20-25 seeds and in one case one per 10 seeds. The farmers' habit of storing only the hard coated traditional maize is sound.

Groundnuts

22. General. Groundnuts grow well on sandy soils, where they are easiest to lift and consequently they are grown especially in the southern part of Karonga and in the central parts of Chitipa. Yields of pure stands of traditionally grown groundnuts vary considerably and are on the average about 300 lb shelled nuts per acre. Some 5-10% of the cropped land is used for groundnuts. In south Karonga nearly half of this is in pure stands and more than half in mixtures with maize or other crops. In Chitipa most groundnuts are grown in mixtures with maize. Trade in confectionary groundnuts is always in shelled nuts. Large size groundnuts are preferred (Chalimbana variety), but good tasting small nuts are also in demand (Malimba variety). Oilnuts usually fetch a lower price and must make up for this by a higher yield; the variety Manipintar excels in this respect. These nuts are sold unshelled. Small farmers prefer to grow Chalimbana and sell them shelled. Large farmers may lack the manpower to shell all their nuts and may grow part of their crop for sale as unshelled oilnuts. Shelling takes one man day per 16 lb shelled large nuts and one man day per 12 lb shelled small nuts.

23. Varieties. In the past the early maturing bunch type Malimba or Barberton was the main variety grown in Karonga. More recently Malimba is being replaced by the more vigorous, semi-spreading, later maturing, less Cercospora sensitive, Chalimbana variety, which commands the confectionary premium, while its larger seeds demand less shelling labour. In Chitipa Chalimbanas are grown and, on the larger farms, Manipintar as well. Chalimbana has the potential disadvantage of being more sensitive to Fusarium but at present this is not a serious threat.

24. Seed and Sowing. The KRDP Evaluation Unit found in 1974/75 that most farmers use home grown seed; only 5% buys seed from ADMARC. Predominantly self-pollinating crops like groundnuts, of which the seed is handled by hand, are very suitable for on-farm multiplication. With a basic supply of purchased good seed a farmer, who looks well after his seed rows, can easily grow his own groundnut seed for a couple of years and renew it thereafter. Yields of up to 800 lb per acre, as found by the Evaluation Section in one of the dryland schemes, are quite possible if good seeds are used. Average yields of Chalimbana groundnuts using improved seeds, are assumed to reach 450 lb per acre in Karonga and 500 lb per acre in Chitipa. Yields of Manipintar groundnuts would be slightly higher and are estimated at 525 lb per acre

in Chitipa. Although ridging eases lifting and improves water and soil conservation, it is not essential for good growth. In Karonga it is being practiced in about half of the fields. Groundnuts are always sown after maize and often too late. In most areas of Karonga and Chitipa January is the best month for sowing and the late rains of April-May do not cause problems during ripening, especially when the Chalimbana or Manipintar varieties are planted. The Evaluation Section also found a marked yield reduction for delayed sowing after January. A clear relation between plant population and yield was also found:

12,000 plants per acre, spacing 3' x 15", yielded 300 lb shelled/acre
16,000 plants per acre, spacing 3' x 10", yielded 400 lb shelled/acre
24,000 plants per acre, spacing 3' x 8", yielded 500 lb shelled/acre

From this, it is clear that plant spacing should be as close as 3' x 8". Experience elsewhere has shown that such a close spacing should also be practiced for types more vigorous than Malimba because it produces more compact plants which ripen more uniformly and incur lower harvest losses. Close spacing is also important for groundnuts to reduce the incidence of rosette disease.

25. Fertilizer. Karonga and Chitipa groundnuts are well nodulated and should easily produce 100 lb shelled nuts per 7 lb N. Groundnuts are greedy feeders for other minerals but at the comparatively low yields envisaged, even under improved conditions, no fertilizer is needed, especially not if preceding or accompanying maize is treated with phosphate (compound 20.20.0) and ionised sulphur (ammonium sulphate). Ca may be deficient in sand areas with over 40 inches rainfall and result in soft pods. This can be prevented by applying an 8" band of 300 lb hydrated lime (on acid soils) or gypsum (or neutral soils) over the open plant holes.

26. Plant Protection. The Evaluation Section found that in Karonga groundnuts are weeded 1-2 times. If started fairly early, this should be sufficient when the stands are reasonably close and uniform, especially for the vigorous Chalimbana or Manipintar varieties. Only an irregular stand needs more weeding since groundnuts do not readily shade other plants out. Light insect and rodent damage occurs quite frequently. Rats and mongooses can cause problems if not properly controlled. Light rosette and Cercospora leafspot was present in half of the fields in 1974/75 especially in central Karonga, where plant populations were comparatively low. Cercospora control through sulphur dusting is being propagated by the Research Section but not generally applied because of the high cost involved. Only under excellent management would sulphur dusting be a paying proposition.

27. Water and Soil Conservation. Drought affects production in many years. Dry season cultivation and ridging or box ridging should therefore be encouraged since this would help considerably in preventing serious drought damage.

Cotton

28. Variety. The Albar 637 variety grown in Malawi is doing very well and may yield up to 2,000 lb seed cotton per acre under rainfed conditions. Some new varieties, which were developed in Makoka, should be tested out in southern Karonga. The Albar 637 fibre is 1-1/16 to 1-3/32 inch long, fairly coarse, strong and even, and is suitable for spinning of 40's yarn to be used in good quality textiles. There is a consistently good demand in the international markets for such a quality handpicked cotton. It can also be used very well in blends with shorter staple, cheaper cotton.

29. Seed and Sowing. In Malawi seed is supplied free of charge which entails a risk of wastage and also excessive sowing rates which can delay fruiting of the cotton. A minimal charge equal to the price payable when used for oil crushing (currently about tambala 1.5/lb) should be considered. This could reduce the seed rate from 40 lb to 20 lb per acre. Vital period rainfall analysis suggests that cotton in central Karonga can best be sown in January and in north and south Karonga in February. In northern Chitipa cotton should be sown with the first rains. As a general rule cotton should be sown immediately after maize. Left-over cotton fields, which were visited in southern Karonga in October 1975, were found to be spaced too far apart. A spacing of 3' x 1' gives a faster rate of production, which should result in savings on the cost of insecticides and on labour. Three to four seeds should be planted per hill and thinned out to single plants three weeks after sowing.

30. Fertilizer. Fertilizer is not used on cotton in Karonga since it is believed that it would extend the growing period and consequently also the period of spraying against insect pests. It is possible, however, that a light top dressing of 1.5 bag ammonium sulphate, at the time that the flowers open, would increase the yields; this should be tested under field conditions. No fertilizer application is assumed in the projections for this Project.

31. Plant Protection. Proper protection against insect pest is essential for profitable cotton growing. An inspection of left-over cotton stalks during the field appraisal in October 1975 suggested that the egg-laying *Heliothis* moths flourished in maize from January to March and then shifted to cotton to produce the american boll worm (ABW). This, together with the first generation of the corn-ear worm, set the scene for a fierce attack by ABW on cotton, sown in February-March which, at that time, had just started to square. Since the squares were still small the greedy feeders stripped of entire fruiting branches to feed themselves. The cotton then developed compensation branches, which in about half of the cases was delayed by the tip boring *Earias* or spiny bollworm. The remaining stalks suggested that this had continued up to August-September when both the growth of the cotton plants and the infestations had slowed down and some bolls, which had escaped insect attacks, had started to open up. Infestations in cotton which was planted later followed a similar pattern but experienced an additional attack by *Dysderus* spp., or stainers, towards the end of the cycle and numerous active stainers were still present in October. However, only few of these carried *Nematospora* and only a very small part of the cotton showed the characteristic yellow discoloration and neppy fibre effect of this fibre-cell protoplasma fungus.

32. The conclusion is that the maize should at an early stage be checked at night (especially in moonlit evenings) for the presence of ABW moths and young larvae. If there are more than one per 10 plants, cotton spraying with DDT should be considered and continued every 10 days till less than one ABW larva is found per six plants. After three DDT sprays, one spray with Sevin should stop Earias. Later spraying depends on the type of insects present; ABW must be controlled with DDT but other bollworms and stainers with Sevin. An alternative spray against ABW is Thiodan (Endosulfan) which is more expensive but also more effective since it also helps to control spiny boll worm and aphids. Spraying pays probably only in good cotton, and farmers should be encouraged to improve their growing methods. Average yields are assumed to reach 800 lb per acre under this Project.

33. Water and Soil Conservation. Since cotton ripens during the dry season the soil becomes very dry without any moisture reserves left which makes early dry season cultivation for the next growing season impossible. Therefore, in most soils tillage has to wait till after the first few inches of rain have fallen and cotton need to be followed by a comparatively late planted crop.

Cassava

34. General. Cassava is grown by most farmers and is of special importance for subsistence in the Karonga Lake shore area. It is a good source of starch and calories which need to be supplemented by fat and protein to form a good diet. Groundnuts and/or fish are good supplements which are also readily available. Cassava is less susceptible to adverse weather and makes good use of rainfall and sunshine even on poor soils. It also fits well into the cropping pattern and does not require much labour time in the peak periods of other crops. Harvesting and farm processing can be done in slack times which leads to a more even use of manpower. Cassava also has a potential as an export crop and small amounts of cassava chips are now being sold to Europe to be used in cattle feed. In the past, research and extension workers have given little attention to this crop but since it plays such an important, and clearly well appreciated, role in the diet of the rural population and because it may have a larger potential for export than thusfar recognized it would not be justified to ignore this crop altogether during the implementation of the Project.

35. Varieties. No special varieties of cassava have been developed in Malawi. Early screening of imported varieties, e.g. from Ibadan in West Africa is necessary, in order to eliminate undesirable, especially mosaic sensitive types, at an early stage. There is, however, little hope that fully mosaic resistant varieties can be found in the near future.

36. Seed and Sowing. Since all Marihot esculenta types from Africa and South America are susceptible to mosaic diseases the chances of infection should be reduced by selective stimulation of material which is still free from the virus. Clean plants should be selected and cuttings of each plant planted out in separate rows in isolated nurseries. Rows without any infected plants should be propagated further, and rows with suspicious

plants discarded. Good and traceable administration of clonal selections and reselections and rapid bulking of approved material are essential. Irrigated nurseries would speed up the multiplication. The Research Section should start clonal selection and multiplication and the village level extension workers should help the farmers to further multiply healthy plants.

37. Plant Protection. One or two weeding after planting and one in December-January of the next rainy season will be enough. There are no insect pests of direct influence on cassava. The main disease problem is mosaic, as discussed earlier. Losses may average 10% but can vary between 5% and 90%. Mosaic is thus a serious threat to the farmers' major subsistence reserve and requires therefore a substantial effort to overcome it.

38. Water and Soil Conservation. Cassava is grown fairly generally on 3' ridges. Most of these are contour ridges and contribute to soil and water conservation. Cassava is lifted during the dry period and this amounts to a dry season cultivation of the soil which is favourable for absorption of early rains.

Beans

39. General. Beans are mainly grown as a subsistence crop and are a major source of vegetable protein to supplement maize and especially cassava. Most beans are interplanted with maize during the rainy season, but they are also grown during the dry season in moist valley soils interplanted with sweet potatoes and other vegetable crops, or groundnuts. Because of their preference for moderately warm growing conditions, they are more common in Chitipa than along the Karonga Lake shore and more in the hills than in the Chitipa plain. Beans, more than groundnuts are suitable for coffee growing areas such as the Misuku hills and could be a good alternative cash crop for these areas. Buying of dry beans, which have about the same value per pound as coffee cherries, could very well be organized at the existing coffee pulperies. The quality of the beans is generally good.

40. Varieties. Beans are grown in mixed varieties and have many different colors and sizes. This probably ensures a greater adaptability to unpredictable growing conditions, particularly weather, than pure lines. Cultivation of pure lines should be tried out to assess the possibility of growing beans for export.

41. Seed and Sowing. Farmers use their own seed and would continue to do so until other sources of seed have shown a superior performance under a representative range of conditions. In interplanted cropping beans occupy about 15-20% of total plant population. In pure stands and with good management bean yields are expected to average 400 lb per acre under the Project.

42. Plant Protection. So far pests and diseases are not common in mixed growing conditions but continuous checks are necessary, particularly when pure lines are grown. Early weeding is essential.

Coffee

43. General. Some 3,200 of Malawi's smallholders grow coffee and the total number of trees is estimated at about one million. The largest concentration is in Misuku hills in Chitipa district where about 1,400 farmers grow about 360,000 trees. Other concentrations are at Vipya North, Phoka and N'kata Bay. Only 55% of all trees are mature and only 30% are bearing. Production is very low and does probably not exceed 1,250 lb cherries per acre or 6 lb per bearing tree. The farmers' interest in the crop seems to be low and only the bare minimum attention is given to essential husbandry practices like mulching, pruning, pest control, weeding, and water and soil conservation. Most of the coffee is grown in the drier, upslope soils, where it is left exposed to the wide variation in rainfall to die-back following alternate bearing (not mitigated by good pruning) and to a host of diseases, of which *Fusarium* is the most notorious, and pests, like white ants, which thrive under such marginal conditions. The growers deliver their cherries at one of 24 pulperies which ADMARC operates in the four coffee areas and were paid only 4 tambala per lb during the 1974/75 season, which certainly does not help encourage better crop care. The pulperies, which are well designed but badly managed, cope easily with the meager production but fail to realize their potential role as centers of improvement. Coffee research has concentrated on the estate type of coffee in the south of Malawi but its results are not very relevant for smallholder coffee grown uphill in the north. There is no evidence that the smallholder coffee industry has benefitted from expert advice in the more recent past and there is a real need to devise a minimum input package which should be tested under smallholder growing conditions.

44. Recommendation. The potential of the smallholder coffee industry should be assessed as a matter of urgency. A thorough field study should therefore be undertaken; the subjects to be covered should include:

- (i) agricultural aspects, e.g. crop husbandry, research, extension, training and credit;
- (ii) costs of coffee growing, processing and further handling; and
- (iii) marketing, i.e. quantity, quality, farmers' prices and export prospects.

First of all the study should determine whether there is sufficient promise of success for reviving the industry and, if this appears to be the case the steps needed to achieve this. The study should also pay attention to the possibility of growing alternative cash crops in the four smallholder coffee areas. The study team should consist of an experienced coffee agronomist who should also be familiar with the various stages of coffee processing, and a qualified economist; it is expected that the study would take about six months.

45. Crop Development Projections. On the basis of the preceding considerations projections have been made on the crop areas to be improved under the Project and on the resulting incremental yields and production - see Tables 1 and 2. A summary of the crop input packages is at Appendix 3 and the estimated total seasonal input requirements at Table 3.

C. Research

Agricultural Research

46. Research programs under KRDP cover two fields of work:

- (i) participation in national research programs, mainly variety trials; and
- (ii) more Project centered work to help relieve regional bottlenecks.

Project research staff contribute to national programs by advising on relative priorities, e.g. drought resistance selection for practically all crops, blast resistance in rice, storage of subsistence produce, but also questions like pasture management (including bush control and introduction of upland or dambo legumes) and introduction of ley-fallows. Another subject could be the introduction of efficient small farmers' equipment for soil cultivation, weeding and pest control. Additionally, more Project specific research programs may be drawn up in consultation with other Project staff who should feel encouraged to indicate bottlenecks in development to the Research staff. The following subjects should be covered:

- (i) fertilizer levels for rice, maize, cotton, coffee, cassava and beans;
- (ii) trials with more mosaic free cassava;
- (iii) control of local pests in cotton, maize and cassava;
- (iv) establishment of optimal sowing sequences; and
- (v) supplementary feeding of cattle with locally available residues or by-products.

The KRDP program of trials for the 1975/76 season is at Appendix 1. Some shifts of emphasis should be considered. The attention, which is given to timing of nitrogen application, to maize breeding, and to perennial crops might be reduced and more emphasis be given to priorities which arise out of discussions with other field sections of the Project namely Extension, Land Husbandry, Evaluation and Animal Husbandry. In collaboration with these sections, particularly Extension, of program a farm scale tests of possible improvements should be set up and implemented. Recommendations for the principal crops are at Appendix 2.

Hydrological Research

47. Hydrological research work in KRDP covers two broad areas. Firstly, it participates in the implementation of a national meteorological and hydrological program which has been set up to collect basic data in the whole of Malawi. The existing network of stations would be expanded with a few new meteorological and riverlevel gauging stations and all staff would be thoroughly trained and supervised with the objective of increasing the reliability of the data collected to a satisfactory level. Secondly, the unit would assist in the formulation of recommendations for crop varieties, sowing dates, farming practices, etc., on the basis of the accumulated data. Moreover the unit would help assess the irrigation potential of various river streams and examine the presence and economic potential of aquifers.

February 15, 1976

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Program of Trials for Karonga and Chitipa, 1975/76

Rice

Hara:

National variety trial
Rice basic fertilizer trial
Timing of nitrogen application trial

Wovwe:

Rice basic fertilizer trial
Timing of nitrogen trial
Blue Bonnet 50 selection trials

Mperere:

Variety trial
Rice basic fertilizer trial
Timing of nitrogen trial
National Faya strains trial (rainfed trial with irrigation)

Lufira:

Rice basic fertilizer trial
Timing of nitrogen trial

Maize Breeding

Baka:

International maize adaptation trial
CIMMYT variety trial
E. African maize variety trial
Diallel trial
Main national maize variety trial

Lufita, Vinthukutu, Kapenda, Lupembe, Mpata:

National maize variety trial

Maize Agronomy

Proposals still to be made

Groundnuts

Baka, Lupembe, Mpata, Vinthukutu, Lufita, Kapenda:

Variety trial
District fungicide trials

Kapenda and Lufita:

Lime + sulphur + gypsum trial

Sorghum

Baka:

National sorghum variety trial

Phaseolus Beans

Baka:

Variety trial
Beans x cassava interplanting trial
Delay crop utilizing residual moisture and fertilizer

Chitipa

Variety x time of planting trial
Mixed cropping x time of planting

Finger Millet

Variety trials at Nthalire, Chisenga, Lufita and Kapenda

Guar Bean

Baka:

Time of planting x variety trial

Chillies

Baka:

Variety x time of planting trial
Spacing x fertilizer trial

Coffee

Program to be discussed later. Variety trial and NPK trial at Misuku to continue and liming trial to be planted.

Cassava

Program to be formulated by working party.

Limes

Observation plots on limes ex-Karonga and ex-Mulanje to be established at Baka and Mwangulukulu for eventual individual tree recording.

Cashew

Individual recording of cashew trees at Baka to continue.

Citrus

Establishment of a plot of promising citrus cultivars at Baka.

Bananas

N x K x Mulching trial to continue.

Jojoba

Observation plots to be established at Baka and in a drier area (Lupembe or Ngara).

Cotton

1. The program of farmers plots carried out in 1974/75 season will be repeated.
2. 5 x one acre plots to be established. Half plots to be sprayed and half unsprayed. Due to expected low yields this may have to be grown by the Research Services.
3. 5 x 1/2 acre plots to be grown for entomological studies. These plots will have to be grown by the Research Services.

Silviculture

Plots of mulberries to be extended - reclearing and mulching
to be carried out.

Variety trial
Variety x time of planting trial
Repeat of time of weeding trial

Kenaf

Time of planting trial (Karonga) site to be finalized yet.

February 15, 1976

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Farm Scale Testing of Crop Husbandry Improvements

It is vitally important to determine the effects of proposed improvements under farm conditions in various locations and, if successful, to demonstrate these to the farmers. Simple farm scale tests and demonstrations should therefore be conducted which would make it possible to compare improved and unimproved fields laid out next to each other. Except for the purchase of inputs, farmers should do all the work themselves since some improvements are likely to pay off even at poor farms and others at good farms only. These tests/demonstrations should be laid out on at least one good, one intermediate and one poor farm in each section served by a Technical Assistant. A list of recommendations for the various crops follows hereunder:

Rice

- optimal time of sowing;
- use of good seed of the most promising selection or a mixture of selections;
- Achievement of a good stand with 100,000 hills per acre to get 200 panicles per m²;
- hand weeding to be started within a week after germination and to be repeated every 2 weeks;
- application of the recommended level of nitrogenous fertilizer; and
- if possible, low cost water control measures by means of improved bunds.

Maize

- dry season cultivation and ridging or box ridging;
- optimal sowing time;
- use of composite or synthetic seed varieties;
- plant population of 20,000 plants per acre using single plants spaced 3' x 10", or 3 plants spaced 3' x 2'6";

- early weeding starting one week after sowing or filling in and repeated every two weeks until the crop closes;
- use of fertilizer: if compound 20.20.0 is used, it must be applied at the rate of 2.5 g, or half a teaspoon, per plant into the planthole which should then be half closed before sowing. If only nitrogenous fertilizer is used half of it should be applied at the same rate close to the plant one month after sowing. The second dressing should be done two months after sowing; and
- stooking, i.e., cutting the complete stalks near ground level at soft dough stage and stacking them upright off the field which is then cultivated and ridged ready for next year's crop.

Groundnuts

- dry season cultivation and ridging or box ridging;
- optimal sowing time;
- use of improved Chalimbana or Manipintar seed;
- plant population of about 25,000 plants per acre (3' x 8");
- early gapping and early weeding; and
- sulphur dusting on good farms only.

Cotton

- early dry season cultivation and ridging or box ridging;
- optimal sowing time;
- close spacing 3' x 1', gapped within a week and thinned to singles 3 weeks after sowing or gapping;
- weeding starting a week after sowing and repeated every two weeks until the crop closes;
- spraying when there are more than one ABW per six plants and repeated every 10 days; type of insecticide depending on the major pest or pests;

- early picking and after the last picking clearing by cattle and goats followed by pulling up and burning of the stalks; and
- the use of 1.5 bag sulphate of ammonia per acre on soils where the growing points develop slowly.

February 15, 1976

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Summary of Crop Input Packages
(per acre)

Rainfed Rice

60 lb improved Faya seed, once every three years.
75 kg sulphate of ammonia.

Irrigated Rice

60 lb Blue Belle or Blue Bonnet seed, once every three years.
150 kg sulphate of ammonia.

Maize

22 lb synthetic or composite seed, once every three years.
50 kg sulphate of ammonia.
50 kg NPK 20.20.0.

Groundnuts

60 lb Chalimbana or 70 lb Manipintar seed, once every three years.

Cotton

8 sprays of DDT, sevin and dimethoate.

March 22, 1976

MALAWI
KARONGA RURAL DEVELOPMENT PROJECT - PHASE IICrop Development, Karonga Lake Shore^{1/}

Year	0 (1975/76)	1 (1976/77)	2 (1977/78)	3 (1978/79)	4 (1979/80)	5 and onwards (1980/81 and onwards)
Total Number of Farmers	21,100	21,600	22,100	22,700	23,200	23,800
DRYLAND CROPS						
(i) Adopting Farmers	2,000	2,500	3,000	3,500	3,500	3,500
(ii) Crop Areas, ac						
Without Project	ac/farm					
Maize	1.6	3,200	4,000	4,800	5,600	5,600
Cassava	1.8	3,600	4,500	5,400	6,300	6,300
Groundnuts	0.4	800	1,000	1,200	1,400	1,400
Cotton	0.2	400	500	600	700	700
With Project						
Improved maize	1.0	1,125	1,625	2,125	2,625	3,125
Improved groundnuts	1.0	1,125	1,625	2,125	2,625	3,125
Improved cotton	1.0	1,125	1,625	2,125	2,625	3,125
Unimproved cassava (or maize)	1.0	4,625	5,125	5,625	6,125	6,625
(iii) Crop Production, sh ton						
Without Project	lb/ac					
Maize	800	1,280	1,600	1,920	2,240	2,240
Cassava, maize equivalent ^{2/}	800	1,440	1,800	2,160	2,520	2,520
Groundnuts	300	120	150	180	210	210
Cotton	300	60	75	90	105	105
With Project						
Maize	2,200	1,232	1,782	2,332	2,882	3,432
Groundnuts	450	252	364	477	589	702
Cotton	800	450	650	850	1,050	1,250
Unimproved cassava/maize	800	1,848	2,048	2,248	2,448	2,648
(iv) Incremental Production, sh ton						
Phase I and II Projects						
Maize	360	430	500	570	640	710
Groundnuts	132	214	297	379	462	544
Cotton	390	575	760	945	1,130	1,315
Phase II Project only						
Maize	-	70	140	210	280	350
Groundnuts	-	82	165	247	330	412
Cotton	-	185	370	555	740	925
RAINFED RICE						
(i) Adopting Farmers	2,500	3,250	4,000	4,750	5,500	5,500
(ii) Area rainfed rice, ac	ac/farm					
(With and Without Project)	2.0	5,000	6,500	8,000	9,500	11,000
(iii) Production, sh ton	lb/ac					
Without Project	1,600	4,000	5,200	6,400	7,600	8,800
With Project	2,400	6,000	7,800	9,600	11,400	13,200
(iv) Incremental, Phase I and II Projects						
Incremental, Phase I only	2,000	2,600	3,200	3,800	4,400	5,000
Incremental, Phase II only	-	600	1,200	1,800	2,400	3,000
IRRIGATED RICE (Phase I only)						
	lb/ac					
(i) Number of Farmers	500	500	500	500	500	500
(ii) Area under irrigation, ac	500	1,000	1,000	1,000	1,000	1,000
(iii) Area cropped, ac	500	1,000	1,000	1,000	1,000	1,000
(iv) Production, sh ton	3,000	750	1,500	1,875	2,250	2,625

^{1/} Cumulative figures of Phase I and II Projects combined, unless stated otherwise.^{2/} Production of one acre unimproved cassava presumed to be equivalent to 800 lb maize.

March 1, 1976

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Crop Development, Chitipa Plains 1/

Year		0 (1975/76)	1 (1976/77)	2 (1977/78)	3 (1978/79)	4 (1979/80)	5 (1980/81)	6 (1981/82)	7 (1982/83)	8 (1983/84)	9 (1984/85)	10 and onwards (1985/86 and onwards)
Total Number of Farmers		12,800	13,100	13,400	13,800	14,200	14,500	14,900	15,300	15,700	16,100	16,500
Existing Areas												
(i) Adopting farmers		300	600	1,000	1,500	2,100	2,700	3,300	4,000	4,700	5,400	5,400
(ii) Crop areas, ac	ac/farm											
Without Project												
Maize, of which	2.5	750	1,500	2,500	3,750	5,250	6,750	8,250	10,000	11,750	13,500	13,500
intercropped with beans 2/3	1.6	480	960	1,600	2,400	3,360	4,320	5,280	6,400	7,520	8,640	8,640
intercropped with groundnuts 1/3	0.9	270	450	900	1,350	1,890	2,430	2,970	3,600	4,230	4,860	4,860
Cassava	1.0	300	600	1,000	1,500	2,100	2,700	3,300	4,000	4,700	5,400	5,400
Millet	0.5	150	300	500	750	1,050	1,350	1,650	2,000	2,350	2,700	2,700
With Project												
Maize, composite	1.0	300	600	1,000	1,500	2,100	2,700	3,300	4,000	4,700	5,400	5,400
Maize, local improved	1.0	300	600	1,000	1,500	2,100	2,700	3,300	4,000	4,700	5,400	5,400
Beans, improved	0.5	150	300	500	750	1,050	1,350	1,650	2,000	2,350	2,700	2,700
Groundnuts, Chalimbana, improved	0.5	150	300	500	750	1,050	1,350	1,650	2,000	2,350	2,700	2,700
Cassava, unimproved	0.5	150	300	500	750	1,050	1,350	1,650	2,000	2,350	2,700	2,700
Millet, unimproved	0.5	150	300	500	750	1,050	1,350	1,650	2,000	2,350	2,700	2,700
(iii) Production, sh ton	lb/ac											
Without Project												
Maize	600	225	450	750	1,125	1,575	2,025	2,475	3,000	3,525	4,050	4,050
Cassava, maize equivalent	800	120	240	400	600	840	1,080	1,320	1,600	1,880	2,160	2,160
Beans	125	30	60	100	150	210	270	330	400	470	540	540
Groundnuts	200	27	45	90	135	189	243	297	360	423	486	486
Millet	500	37	75	125	137	262	337	412	500	587	675	675
With Project												
Maize, composite	2,400	360	720	1,200	1,800	2,520	3,240	3,960	4,800	5,640	6,480	6,480
Maize, local	2,200	330	660	1,100	1,650	2,310	2,970	3,630	4,400	5,170	5,940	5,940
Cassava	800	60	120	200	300	420	540	660	800	940	1,080	1,080
Beans	400	30	60	100	150	210	270	330	400	470	540	540
Groundnuts	500	33	60	105	163	233	308	383	465	553	640	675
Millet	500	37	75	125	137	262	337	412	500	587	675	675
(iv) Incremental, Phase I and II Projects												
Maize		405	810	1,350	2,025	2,835	3,645	4,455	5,400	6,345	7,290	7,290
Groundnuts		6	15	15	33	52	65	86	105	130	154	189
Incremental, Phase II only												
Maize		-	405	945	1,620	2,430	3,240	4,050	4,995	5,940	6,885	6,885
Groundnuts		-	9	9	27	46	59	80	99	124	148	183
Expanded Crop Areas												
(i) Pairs of Oxen												
New		-	33	67	100	100	100	100	100	100	-	-
Cumulative		100	133	200	300	400	500	600	700	800	800	800
(ii) Increased crop areas, ac	ac/farm											
Maize, composite	2	350	466	666	1,000	1,400	1,800	2,200	2,600	3,000	3,200	3,200
Groundnuts, manipintar	2	350	466	666	1,000	1,400	1,800	2,200	2,600	3,000	3,200	3,200
(iii) Production, sh ton	lb/ac											
Maize	2,400	420	559	799	1,200	1,680	2,160	2,640	3,120	3,600	3,840	3,840
Groundnuts	525	92	122	175	263	368	473	578	683	788	840	840
(iv) Incremental, Phase II only												
Maize		-	79	319	720	1,200	1,680	2,160	2,640	3,120	3,360	3,360
Groundnuts		-	17	70	158	263	368	473	578	683	735	735

1/ Cumulative figures of Phase I and II Projects combined, unless stated otherwise.
February 10, 1976

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Projected Seasonal Input Requirements ^{1/}

Year	0 (1975/76)	1 (1976/77)	2 (1977/78)	3 (1978/79)	4 (1979/80)	5 (1980/81)	6 (1981/82)	7 (1982/83)	8 (1983/84)	9 (1984/85)	10 and onwards (1985/86 and onwards)
Karonga											
Rainfed rice											
- Seed, sh ton	80	100	120	145	165	110	110	110	110	110	110
- Sulphate of ammonia, m ton	415	490	600	715	825	825	825	825	825	825	825
Irrigated rice (Lufira)											
- Seed, sh ton	15	15	20	20	15	15	15	15	15	15	15
- Sulphate of ammonia, m ton	75	150	190	225	225	225	225	225	225	225	225
Maize											
- Composite or synthetic seed, sh ton	6	9	12	14	17	19	13	13	13	13	13
- Sulphate of ammonia, m ton	56	81	106	131	156	175	175	175	175	175	175
- Compound 20.20.0 fertilizer, m ton	56	81	106	131	156	175	175	175	175	175	175
Chalimbana groundnuts											
- Seed, sh ton	23	33	43	53	63	70	47	47	47	47	47
Cotton, number of one-acre insecticide packages ^{2/}	1,125	1,625	2,125	2,625	3,125	3,500	3,500	3,500	3,500	3,500	3,500
Chitipa											
Maize											
- Seed, sh ton	4	6	9	14	19	25	30	36	42	47	32
- Sulphate of ammonia, m ton	48	83	133	200	280	360	440	530	620	700	700
- Compound 20.20.0 fertilizer, m ton	48	83	133	200	280	360	440	530	620	700	700
Chalimbana groundnuts											
- Seed, sh ton	3	6	10	15	21	27	33	40	47	54	36
Manipintar groundnuts											
- Seed, sh ton	6	8	12	18	25	32	39	46	53	56	37
Totals											
Seeds, sh ton											
- Rice	95	115	140	165	180	125	125	125	125	125	125
- Maize	10	15	21	28	36	44	43	49	55	60	45
- Chalimbana groundnuts	26	39	53	68	84	97	80	87	94	101	83
- Manipintar groundnuts	6	8	12	18	25	32	39	46	53	56	37
Fertilizer, m ton											
- Sulphate of ammonia	594	804	1,029	1,271	1,486	1,585	1,665	1,755	1,845	1,925	1,925
- Compound 20.20.0	104	165	239	331	436	535	615	705	795	875	875
Cotton, insecticide packages	1,125	1,625	2,125	2,625	3,125	3,500	3,500	3,500	3,500	3,500	3,500

^{1/} Only the quantities of fresh, improved seeds are included; these would be supplied every third year and during the other two years, seeds would be retained by the farmers from their own production.

Seed rates, lb/ac

Rice 60
Maize 22
Chalimbana groundnuts 80
Manipintar groundnuts 70

Fertilizer rates, kg/ac

Rainfed rice : 75 kg sulphate of ammonia
Irrigated rice : 150 kg sulphate of ammonia
Maize : 50 kg sulphate of ammonia and 50 kg compound 20.20.0

^{2/} Based on 8 sprays with sevin, DDT and dimethoate per acre.

February 23, 1976

MALAWIKARONGA RURAL DEVELOPMENT PROJECT - PHASE IILivestock DevelopmentGeneral

1. There are about 625,000 cattle in Malawi. Some 20,000 are in Government or private estates or ranches and the balance are kept in village herds on customary land. The national herd is small relative to the human population of around five million, particularly in the Southern Region, where there are 29 people to each animal. The people/cattle ratio is about 6.5 in the Central Region and 3.3 in the Northern Region. This results in a much stronger demand and better market for slaughter cattle in the Southern and Central Regions. The Cold Storage Company operates the only two modern abattoirs near the main urban centers of Lilongwe and Blantyre, and offers premium prices for choice cattle. Stall feeding based on maize stover and madeya (maize bran) has been successfully developed, particularly around Lilongwe, and its rate of expansion is limited by the supply of feeder cattle. Under these circumstances the objective of KRDP should be to increase the productivity of the village herds and output of young feeder cattle for fattening closer to the southern markets.

Phase I Performance

2. The aim of the livestock component of Phase I was, first, to improve animal health through construction of 22 new dip tanks and expansion of veterinary services by increasing field staff and supplies of drugs and vaccines. Second, to increase production by improving animal husbandry practices through expanded extension efforts and, third, to improve marketing facilities and opportunities for the sale and movement of cattle to the south.

3. In 1971, 75% of the 30,000 head of cattle in Karonga district were within a radius of five miles from the existing 11 dip tanks. In contrast, less than 25% of the 25,000 cattle in Chitipa district were within five miles of the 8 dip tanks at that time. Twelve new dips were completed by mid 1974, which increased the percentages of cattle within 5 mile radius to 88% for Karonga and 52% for Chitipa. The remaining 10 dip tanks are scheduled for completion by March 1976, which will mean that 90% of the cattle in the whole project area are within 5 miles of dip tanks. Apart from tick-borne diseases, controlled through regular dipping, progress has been made in reducing the incidence of internal parasites, and an outbreak of foot and mouth disease from Tanzania has been controlled in late 1975 by inoculation and quarantine.

4. The figures in Table 1, compiled by the Veterinary Department from the cattle registers for each district, show that from 1965 to 1972, before any project influence, total cattle numbers for Karonga had increased gradually from about 27,000 head to 31,000 head. In Chitipa there was a decline from 28,500 to 25,000 head. However, from 1973 to August 1975, there has been a substantial increase in cattle numbers for both districts, viz: from about 58,000 to 70,000 head. Collection of statistical information under closer supervision provided by project staff is probably better than in the past, but figures for 1974 and 1975 are only preliminary. The recent increase in cattle numbers does suggest that improved health services will have a major impact on cattle numbers, although border crossings to and from Zambia and Tanzania, which are thought to be considerable, may have confused the picture. No clear trend is shown in percentage productivity but offtake figures are known to be unreliable.

5. Extension services, particularly on animal health and nutrition, are largely provided by Veterinary Assistants who are usually stationed at, and in charge of, a dip tank. Veterinary and animal husbandry staff was increased under Phase I from 25 Veterinary Assistants supervised by two Assistant Livestock officers, to 29 Veterinary Assistants and 6 Development Assistants, supervised by an expatriate Senior Animal Husbandry officer and four Assistant Livestock officers. The Karonga livestock center has also played a useful role in trial, demonstration and extension. Farmers in general appear to be receptive to the lines of extension worked out by the Senior Animal Husbandry officer, which will continue to be given increasing emphasis during Phase II.

6. Phase I proposals envisaged setting up a further 4 cattle markets. A market which had been opened in 1968 at Nthalire in south Chitipa had been an immediate success with sales of more than 1,000 per annum by 1972. Nthalire has road access to the south which permitted the Cold Storage Company, the LLDP Ranch and other southern buyers to operate for both slaughter and feeder cattle. A second market opened in 1969 in north Chitipa was not a success because of poor road access to the south and higher cattle prices available across the borders in Tanzania and Zambia. The first markets in Karonga, which were opened at Kasowa in 1972 and N'gara in 1973, failed to attract cattle. Poor access discouraged southern buyers, and farmers obtained high prices from local butchers. Construction of additional markets would be unwise until there is better access to the south. This might be either by improvement of the road link across the escarpment south of Chilumba, or by barge from Chilumba to Chipoka. Unfortunately, the design of the new barge now being assembled does not seem to be suitable for cattle transport. No further marketing proposals are made for Phase II.

7. The holding ground-cum-ranch of 18,000 acres proposed for Phase I is not being developed. Further investigation showed the land to be unsuitable for ranching; foundation stock were unavailable because the Dzalanyama ranch of LLDP warranted priority in purchase of breeding stock in critically

short supply; and, third, the failure to develop marketing facilities away from Nthalire removed the need for a cattle holding ground. In lieu of the holding ground, a small seasonal hill grazing scheme has been established at Chisi to relieve grazing pressure on the Lufira irrigation rice scheme on Karonga Lake shore. In addition, a livestock trial and demonstration center is being established at Lufita in north Chitipa under Phase I provisions. It is planned for completion during 1975/76 but it is possible that work will continue into 1976/77. The Lufita triangle of 30,000 acres has about 15% of dambo (poorly drained land good for dry season grazing), 10% cultivated and 75% not yet cultivated. Part of the latter area is being developed under the Lufita agricultural scheme. The rest is considered suitable for future development of integrated agriculture incorporating livestock in the farming system. A system acceptable to the local people has yet to be devised and this will be a primary objective of the livestock center for which an area of approximately 2,000 acres has been acquired. There is also need for an agricultural research station for Chitipa district, and this is to be sited with the livestock center to facilitate integration of livestock and crop husbandry. The nearby existing non-residential farmers' training school is to be transferred to the center as a residential school under Phase II. The foundation herd for the center will comprise 30 selected zebu-type breeding cows and a bull to be provided from Government herds.

Phase II Proposals

8. The objective will continue to be to improve and increase the village herds and their productivity and to encourage the production and sale of feeder cattle from areas which are accessible to the south.

9. Animal Health. Animal health services will continue to be of first concern. Dip construction is almost completed and only two more will be constructed under Phase II at Misuku and Therere. The 43 dip tanks then in existence, will bring almost all cattle within 5 miles of a dip. The animal health service will continue under Phase II. However, the main emphasis of the livestock component will be encouragement of a higher standard of animal husbandry made possible by the disease control facilities.

10. Extension. Before the start of the first phase project there were 25 animal husbandry and veterinary assistants in the two districts and an additional 12 posts were created during the first project. They will continue to work under the advice of an animal husbandry specialist and four field officers animal husbandry (TO). The livestock centers at Karonga and Lufita will also play a major role in demonstration of improved animal husbandry practices. Cattle owners will be encouraged to adopt better breeding techniques and to improve management and nutrition standards.

11. Breeding techniques may be improved along the following lines:

- (i) to cull unproductive stock, particularly barren cows, unthrifty young stock and bulls in excess of requirements;
- (ii) to keep only selected bulls and, to the extent practicable, herd them separately from the cows except between January and April. This would encourage the optimum time of calving towards the end of the dry season and help to reduce calf mortality;
- (iii) to exchange bulls between areas to reduce the present high level of inbreeding.

12. Nutrition. The main scope for improving nutritional levels is through introduction of rotational grazing in the communal grazing areas. Fencing is too expensive, so grazing will have to be controlled by closing demarcated areas for agreed periods. The value of rotational grazing will not be evident for some years and farmer acceptance and adherence will only be maintained if influential leaders are convinced of the advantages. This should be the main objective for the extension officers and early trials and demonstrations should be commenced on the dambo lands of the Lufita livestock center. As liveweight losses occur mostly in the last two months of the dry season, those groups who appreciate the value of rotational grazing will be encouraged to plant a legume, either stylo or leucaena, on a proportion of their grazing land.

(i) Stylo: Evidence from existing stylo plots suggests that it germinates very well in the area and that it could be introduced over a period of three years, seed collected from the first year sowing being used for expansion during the second year and so on, thus reducing the overall capital costs. The improved areas, which ideally should be sited near the dry season water supplies, will be lightly grazed in the early rains and then held over as standing hay for short-time grazing (2-3 hours per day) during September, October and November. The cost of seed is, however, relatively high. In 1974 the cost was MK 5 per lb and the minimum sowing rate is 2 lb per acre. Its feasibility, therefore, depends on the farmers collecting seed from an initial small area for subsequent expansion.

(ii) Leucaena: This can be used as an alternative legume to solve the weight loss problem. Its main advantage over stylo is cost, i.e. MK 2 per 1,000 stubs, and it is proposed to establish leucaena plots at every dip tank in the first year of Phase II. These will be 1/4-1/2 acre in size. The further establishment of leucaena plots elsewhere in the Project area would make the legume accessible to all farmers eventually. Leucaena has thrived and yielded well, but for its successful establishment the seeds, which have a very hard coat, should be scarified and inoculation of the soil with rhizobium bacteria is necessary, or, alternatively, soil from beneath existing leucaena trees should be used.

13. Weaner/Yearling System: This change in management of the herd should increase the farmer's profit. Grazing pressure sets limits to the size of the herds, but unproductive cattle are still being kept and others have to be held for a long time before they are fit to market. It is proposed to introduce the weaner/yearling system on a pilot scale to demonstrate the benefits of rearing the young male cattle on a higher plane of nutrition so that they can be sold at one year or a little older as feeder cattle. The feeder cattle will not only realize higher prices, but their early quitting from the herd will enable the farmer to carry more breeding cows and increase productivity. The calves would be weaned from their dams when about six months old and on-reared on a high level of nutrition by supplementing their grazing with maize stover and madeya or leucaena. They should be ready for sale as feeder cattle at an age of 12 to 15 months. The main market demand will be from the south where conditions are better for stall fattening. The weaner/yearling system should, therefore, be initiated in south Chitipa where there is road access southwards.

14. Cattle Sheds: Most cattle are kept overnight in open kraals but some are provided with roofs. Though the present standard of cattle sheds is better than in many areas of the country, advice on further improvements will be given to farmers, and the value of farm manure and its usage will be stressed.

February 15, 1976

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT, PHASE II

Cattle Numbers, Growth Rate and Offtake, Karonga and Chitipa Districts

	1965	1970	1971	1972	1973	1974 ^{1/}	1975 ^{1/}
<u>Karonga District</u>							
Total Herd	26,575	28,230	30,188	31,267	32,470	34,600	38,000
Slaughter	3,096	3,459	3,634	2,823	3,111	2,900	2,053
Offtake %	11.7	12.2	12.1	9.0	9.3	8.4	5.4
Growth %	<u>N.A.</u>	<u>N.A.</u>	<u>6.6</u>	<u>4.3</u>	<u>3.8</u>	<u>6.6</u>	<u>9.8</u>
Productivity %	<u>N.A. ^{2/}</u>	<u>N.A. ^{2/}</u>	<u>18.7</u>	<u>13.3</u>	<u>13.1</u>	<u>15.0</u>	<u>15.2</u>
<u>Chitipa District</u>							
Total Herd	28,476	24,170	24,370	24,846	25,218	29,400	32,000
Slaughter	1,140	2,932	2,439	2,788	2,271	1,900	1,581
Market Sales	-	<u>769</u>	<u>649</u>	<u>1,089</u>	<u>877</u>	<u>800</u>	<u>800</u>
Total Offtake	<u>1,140</u>	<u>3,701</u>	<u>3,088</u>	<u>3,877</u>	<u>3,148</u>	<u>2,700</u>	<u>2,381</u>
Offtake %	4.0	15.3	12.7	15.6	12.5	9.2	7.4
Growth %	<u>N.A.</u>	<u>N.A.</u>	<u>0.8</u>	<u>1.9</u>	<u>1.5</u>	<u>N.A.</u>	<u>8.8</u>
Productivity	<u>N.A. ^{2/}</u>	<u>N.A. ^{2/}</u>	<u>13.5</u>	<u>17.5</u>	<u>14.0</u>	<u>N.A. ^{2/}</u>	<u>16.2</u>
<u>Project Area (Two Districts)</u>							
Total Herd	55,051	52,400	54,558	56,113	57,688	64,000	70,000

^{1/} Preliminary.

^{2/} Not available.

December 5, 1975

MALAWIKARONGA RURAL DEVELOPMENT PROJECT - PHASE IIAgricultural CreditA. General

1. Few smallholders are in a position to pay cash for seasonal inputs and farm implements and the availability of credit facilities is therefore vital to help them increase their agricultural production. So far, however, no central agricultural credit institution has been established in Malawi and credit is handled by a number of agencies mainly attached to specific projects which cover only a small part of the country.
2. The credit sections of the four major Regional Development Projects, namely Lilongwe, Lower Shire, Karonga and Salima, are among the most important credit agencies. In each case the project manager is responsible for credit operations with the assistance of senior credit staff and office and field support. Close relationship is being maintained with extension staff. LLDP, which has the largest volume of credit operations, increased its seasonal lending volume from about MK 500,000 in 1973/74 to MK 700,000 in 1974/75 and is projected to reach over MK 2.0 million by 1978/79. By then some 55,000 farm families are expected to benefit through this scheme. Medium-term credits are expected to reach about MK 140,000 by 1978/79. Repayment rates are very satisfactory.
3. Several crop development authorities also operate credit schemes, for example the Kasungu Flue-Cured Tobacco Authority which trains, settles and finances tobacco growers on 20 acre holdings. Medium and seasonal credit is given for tobacco and rotation crops. Administrative arrangements are efficient and include bulk purchase of inputs, supervision, and full control of market outlets which ensures repayment. Crop authorities with expert knowledge of production and control of marketing, have special advantages in administration of credit to their growers.
4. Credit is also extended to 19 settlement schemes primarily intended for Malawi Young Pioneers who, however, have increasingly been replaced by local farmers. Medium and seasonal credit amounting to about MK 150,000 was available in 1974/75 from the Settlement Credit Fund administered by MANR. Due to inadequate supervision and social and political problems related to settlement, including abandonment of holdings, repayment records have been poor in most schemes. Other schemes with credit facilities administered by MANR from UK funds include Phalombe Plain, Mpenu, and West Mzimba land development projects.

5. The Government Loans Board (GLB) under the Ministry of Trade, Industry and Tourism, handles credit for agriculture and commercial enterprises. Just over one half of the presently available fund of about MK 440,000 is used for the agricultural sector and handled by MANR extension staff. GLB introduced seasonal credit (MK 2,000) in its operations in 1972/73 and demand increased rapidly. In 1974/75 loans amounting to MK 54,000 were approved and repayment by the end of the harvest season was 90%. For 1975/76 requests for MK 103,000 have been received. Due to administrative constraints, seasonal credit is given only to farmer groups. Conditions are that the groups should be formed by the farmers themselves, that they have operated for a minimum of two years and that a committee of group members is responsible for recovery of funds. Experience so far is very encouraging. Part of GLB's activities are at present in Chitipa district, but KRDP will take over the Chitipa operations from GLB in the 1975/76 season.

B. Karonga Rural Development Project

Phase I

6. Although the volume of credit disbursements is behind the original schedule because of the late project start, the number of farmers participating in the credit scheme has increased faster than expected. At appraisal it was estimated that the 1974/75 seasonal credit would amount to MK 90,000 for 2,400 farmers, whereas in fact 4,000 farmers participated for a total of MK 60,000. The reason for this is an early change in approach. Not only farmers in the schemes are eligible for credit, but farmers outside the scheme are also encouraged to participate. The project procures seasonal inputs through ADMARC and provides it to participants in kind. The farmers are registered at an ADMARC market through which produce is sold. At the time of harvest KRDP credit assistants collect each time a predetermined percentage of the sales proceeds so that by the end of the season all advanced monies are received back. Repayment rates have been very good in the past. For the 1974/75 season repayments started at a slower rate due to a bad harvest, but project management is confident that the average collection rate of 95% will be maintained. Defaulters do not receive new credit until all outstanding debts are settled. Up to the 1974/75 season a "credit charge" of 10% plus a "10% mark-up" was added to the basic cost of seasonal inputs to recover costs of operating the credit scheme. A new Executive Order has established a flat charge of 12-1/2% for all seasonal credit throughout the country. Medium-term loans have been in line with projections, and repayments are fairly good (Table 2).

Phase II

7. Seasonal Credit. Seasonal credit would be provided to an estimated 6,300 farmers in Year 1, increasing to 11,000 in Year 4. Participants in the

new areas of Chitipa district number 600 in Year 1, increasing to 2,100 in Year 4 and are included in the above figures. Inputs would only be provided in kind with a mark-up of 12.5%. It is expected that a system of cash down-payments would be introduced and that these would rise gradually and represent 20% of total costs of inputs in Karonga and 15% in Chitipa by 1979/80 (Project Year 4). Group credit would be encouraged where possible. In Karonga credit has only been given to individuals in the past, partly because the social structure resists group credit. In the Chitipa plains, however, many farmers groups have already been established and during the first years of operation one important function of the Project would be to assist these groups in keeping proper records. A summary of projected seasonal credit requirements is at Table 1.

8. Medium-Term Credit. Medium-term credit would continue to be provided for various farm implements. Trained oxen and ox carts to cultivate fields and transport inputs and produce are much in demand by smallholders and therefore represent the major items under this category. With the increased activities in Chitipa area the total loan value is expected to rise from MK 32,000 in 1976/77 to MK 65,600 in 1979/80. Details of the projected requirements are given in Table 2.

9. Project Credit Fund. Table 3 summarizes the cash flow of the two credit components discussed in the previous paragraphs.

Group Credit

10. One of the first attempts to issue seasonal inputs to groups of farmers was made in LLDP in 1971/72. However, it proved that due to the prevailing low level of literacy LLDP staff spent more time in assisting the groups than it would have taken to handle individual accounts. Therefore, it was discontinued. In the meantime, LLDP has started anew, apparently with much more success, due partly to different procedures in issuing inputs. In Chitipa, group credit has been given by GLB and the experience so far is very encouraging. Groups of farmers, which can range between 20-200 or possibly more members, are governed by elected committees consisting of a chairman, a treasurer and a number of farmers which represent the group as one body. Inputs are made available to the group as a whole, which in turn is responsible for distribution thereof to its members, maintenance of records and collection for repayments. Credit staff assists with setting up accounting procedures and headquarters keeps only one account per group. Group members are mutually responsible for repayment by all members and experience has shown that effective pressure is applied by the group on members who are late in repayment. An additional safeguard is the fact that no member is eligible for new credit unless the group as a whole has repaid its total obligations. In the past there was no legal tie in group arrangements. However, it is now proposed that the authorization form for group credit will

be signed by each member, with the status of a promissory note. In Chitipa credit would be given to groups only, but in Karonga individual credit will prevail.

C. Future Organization of Smallholder Credit

11. A basic concept of NRDP is a change from project-specific management to MANR management, as its 40 or more development projects covering ultimately the whole country come into implementation during the next 15 years or so. This will also apply to credit within existing project areas where the separate project or agency credit management will be taken over by MANR and its regional offices. As the ongoing major development projects terminate, their headquarters will probably serve as new regional offices under NRDP. Hence, their experienced credit management will continue to operate, but under closer policy direction and control of MANR headquarters. On the other hand, the proposed new development projects (Mzimba, Thiwi-Lifidzi, etc.) will not have sufficient field staff with experience in credit operations and will have to be managed during an interim period from headquarters.

12. The planned expansion of credit activities necessitates a re-thinking of credit policies and a committee in MANR is now preparing proposals for the administration of credit covering ultimately the whole country. It is evident that some changes are needed. First, it would be unrealistic to expect that there will ever be the funds and staff to meet the full credit needs of every small farmer. Priority must be given to lending which will yield substantial benefits, such as seasonal credit for inputs and medium-term credit for draft oxen and implements. Priority in seasonal credit should be given to areas where the response to inputs is known to be high and the farmers are receptive to innovation. Attention must also be given to credit-worthiness of borrowers, but this should not be overdone to the extent that those who receive credit are those who need it least. It should not be freely extended to farmers who are in a position to pay cash for their inputs. Farmers in many areas where no credit is presently available have been able to purchase substantial amounts of fertilizers for cash. Although such farmers could continue to pay cash, they are likely to be the first to apply for credit. Credit is such an important tool in encouraging farmers to adopt improved production practices that it should be available, but every effort should be made to stimulate sales of inputs for cash. An important move in this direction would be for ADMARC to reinstate its previous 7-1/2% discount for cash purchases of fertilizers in bulk. A second means of stimulating cash sales would be to gradually reduce credit for inputs as the farmers become better able to pay cash.

13. In addition to increased selectivity, a second needed change in credit policy is that more effort must be made to place the system on a self-sustaining basis. The problem lies with the seasonal rather than the medium-term credit. Individual seasonal credit is so small that mark-up charges fail to meet the cost of administration. Charges have recently been standardized at 12-1/2% but the average cost of administration is estimated at about 25%. The substantial introduction of group credit, it is estimated, could reduce costs by 10%.

February 15, 1976

MALAWI
KARONGA RURAL DEVELOPMENT - PHASE II
Estimated Seasonal Credit Requirements^{1/}
(MK)

	(1975/76)	<u>Year 1</u> (1976/77)	<u>Year 2</u> (1977/78)	<u>Year 3</u> (1978/79)	<u>Year 4</u> (1979/80)	(1980/81)	(1981/82)	(1982/83)	(1983/84)	(1984/85)	(1985/86)
<u>Karonga</u> - Maize	18,184	26,334	34,484	42,534	50,684	56,850	56,250	56,250	56,250	56,250	56,250
Groundnuts	4,600	6,600	8,600	10,600	12,600	14,000	9,400	9,400	9,400	9,400	9,400
Cotton	13,500	19,500	25,500	31,500	37,500	42,000	42,000	42,000	42,000	42,000	42,000
Rice	<u>83,581</u>	<u>99,560</u>	<u>122,660</u>	<u>145,760</u>	<u>162,300</u>	<u>155,700</u>	<u>155,700</u>	<u>155,700</u>	<u>155,700</u>	<u>155,700</u>	<u>155,700</u>
Total value of inputs	119,865	151,994	191,244	230,394	263,084	268,550	263,350	263,350	263,350	263,350	263,350
Percentage downpayment by farmers for inputs sold on credit	-	5	10	15	20	25	30	30	30	30	30
Credit required for inputs	<u>119,865</u>	<u>144,394</u>	<u>172,120</u>	<u>195,853</u>	<u>210,467</u>	<u>201,413</u>	<u>184,345</u>	<u>184,345</u>	<u>184,345</u>	<u>184,345</u>	<u>184,345</u>
<u>Chitipa</u> - Maize	15,472	26,662	42,662	64,200	89,820	115,540	141,160	170,020	198,880	224,500	223,000
Groundnuts	<u>1,680</u>	<u>2,640</u>	<u>4,160</u>	<u>6,240</u>	<u>8,700</u>	<u>11,160</u>	<u>13,620</u>	<u>16,280</u>	<u>18,940</u>	<u>20,880</u>	<u>13,860</u>
Total value of inputs	17,152	29,302	46,822	70,440	98,520	126,700	154,780	186,300	217,820	245,380	236,860
Percentage downpayment by farmers for inputs sold on credit	-	-	5	10	15	20	25	25	25	25	25
Credit required for inputs	<u>17,152</u>	<u>29,302</u>	<u>44,481</u>	<u>63,396</u>	<u>83,742</u>	<u>101,360</u>	<u>116,085</u>	<u>139,725</u>	<u>163,365</u>	<u>184,035</u>	<u>177,645</u>
<u>Total</u> credit required for inputs	137,017	173,696	216,601	259,249	294,209	302,773	300,430	324,070	347,710	368,380	361,990
Percentage markup	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5	12.5
Volume of seasonal credit repayments ^{2/}	154,144	195,408	243,676	291,655	330,985	340,620	337,984	364,579	391,174	414,428	407,239

^{1/} Based on input quantities as given in Annex 1, Table 3, and on 1976 prices
^{2/} Repayments will only be received in the following year
March 2, 1976

ANNEX 2
Table 1

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Medium-Term Credit Requirements
(MK)

Unit Cost	^{1/}	1973/74	1974/75	1975/76	Year 1 (1976/77)	Year 2 (1977/78)	Year 3 (1978/79)	Year 4 (1979/80)	(1980/81)	(1981/82)
Karonga										
Oxen (pairs)	100	(65)	(40)	(50) 5,000	(50) 5,000	(50) 5,000	(50) 5,000	(50) 5,000	(25) 2,500	(25) 2,500
Ox-Carts	300	(11)	(18)	(25) 7,500	(30) 9,000	(40) 12,000	(50) 15,000	(50) 15,000	(25) 7,500	(25) 7,500
Ploughs and Chains	30	(55 + 39)	(27 + 35)	(50) 1,500	(75) 2,250	(75) 2,250	(75) 2,250	(75) 2,250	(38) 1,125	(38) 1,125
Ridgers	45	(8)	(16)	(25) 1,125	(30) 1,350	(30) 1,350	(30) 1,350	(30) 1,350	(15) 675	(15) 675
Sprayers	35	(58)	(19 + 119)	(150) 5,250	(150) 5,250	(150) 5,250	(150) 5,250	(150) 5,250	(75) 2,625	(75) 2,625
sub-total		11,225	12,329	20,375	22,850	25,850	28,850	28,850	14,425	14,425
Chitipa										
Oxen (pairs)	100				(25) 2,500	(50) 5,000	(75) 7,500	(75) 7,500	(75) 7,500	(75) 7,500
Ox-Carts	300				(15) 4,500	(30) 9,000	(50) 15,000	(75) 22,500	(75) 22,500	(75) 22,500
Ploughs and Chains	30				(50) 1,500	(100) 3,000	(150) 4,500	(150) 4,500	(150) 4,500	(150) 4,500
Ridgers	45				(15) 675	(30) 1,350	(50) 2,250	(50) 2,250	(50) 2,250	(50) 2,250
sub-total					9,175	18,350	29,250	36,750	36,750	36,750
Total Loan Value		11,225	12,329	20,375	32,025	44,200	58,100	65,600	51,175	51,175
Add 10% p.a. interest ^{2/}				4,278	6,725	9,282	12,201	13,776	10,747	10,747
Amounts to be repaid by farmers				24,653	38,750	53,482	70,301	79,376	61,922	61,922
Spread of Repayments over 3 years			2,700 ^{3/}	4,340	4,340	4,767	8,217	12,916	17,827	23,433
				4,768	4,767	8,218	17,917	17,827	23,434	26,459
					8,218	12,917	17,828	23,434	26,459	20,641
			2,700 ^{3/}	9,108	17,325	25,902	38,962	54,177	67,720	70,533

- ^{1/} Estimate at 1976 prices
^{2/} Interest at 10% p.a. on unpaid balance
^{3/} Based on Project Management estimates

March 2, 1976.

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Total Credit Cash Flow
(MK '000)

	(1974/75)	(1975/76)	Year 1 (1976/77)	Year 2 (1977/78)	Year 3 (1978/79)	Year 4 (1979/80)	(1980/81)	(1981/82)
<u>Sources of Fund</u>								
Unspent balance brought forward		1.0 <u>1/</u>						
New Funds required	46.4	84.1	42.9	50.6	48.7	31.2		
Loan Repayments:								
Seasonal	24.0 <u>1/</u>	68.1	154.1	195.4	243.7	291.7	331.0	340.6
Medium-term	2.7 <u>1/</u>	9.1	17.3	25.9	39.0	54.2	67.7	70.5
	26.7	77.2	171.4	221.3	282.7	345.9	398.7	411.1
Less bad debts <u>2/</u>	1.3	3.9	8.6	11.1	14.1	17.3	19.9	20.6
	25.4	73.3	162.8	210.2	268.6	328.6	378.8	390.5
Funds available for lending	<u>72.8</u>	<u>157.4</u>	<u>205.7</u>	<u>260.8</u>	<u>317.3</u>	<u>359.8</u>	<u>378.8</u>	<u>390.5</u>
<u>Utilization of Funds</u>								
Seasonal	60.5	137.0	173.7	216.6	259.2	294.2	302.8	300.4
Medium-term	<u>12.3</u>	<u>20.4</u>	<u>32.0</u>	<u>44.2</u>	<u>58.1</u>	<u>65.6</u>	<u>51.2</u>	<u>51.2</u>
Loans required	72.8	157.4	205.7	260.8	317.3	359.8	354.0	351.6
Unspent balance	-	-	-	-	-	-	24.8	38.9
	<u>72.8</u>	<u>157.4</u>	<u>205.7</u>	<u>260.8</u>	<u>317.3</u>	<u>359.8</u>	<u>378.8</u>	<u>390.5</u>
<u>Contingencies</u>								
5% physical			10.3	13.0	15.9	18.0		
			216.0	273.8	333.2	377.8		
Price contingencies <u>3/</u>			19.4	46.5	86.6	136.0		
Total Loans required			<u>235.4</u>	<u>320.3</u>	<u>419.8</u>	<u>513.8</u>		

1/ Based on Phase I project records.

2/ 5% of seasonal and medium-term credit.

3/ 9% year 1, 8% year 2-4.

February 24, 1976

MALAWIKARONGA RURAL DEVELOPMENT PROJECT - PHASE IICrop Marketing and Prices

1. The main crops marketed in Karonga and Chitipa are rice, maize, groundnuts, cotton, coffee and pulses. The Agricultural Development and Marketing Corporation (ADMARC) handles a large share of the agricultural output of both districts and buys in effect all cotton and coffee and almost all marketable rice. Although ADMARC is empowered to purchase all produce grown on customary land, a large amount of the other crops is either sold or bartered among the farmers themselves or sold to traders. During the last few years this was particularly the case with groundnuts, since the unofficial prices which traders were willing to pay exceeded ADMARC's guaranteed minimum price at least two or three times. Of Chitipa's marketable maize ADMARC buys only small amounts which it subsequently sells in Chitipa town. In Karonga, ADMARC hardly purchases any maize at all but at two locations it sells maize which is being imported from other parts of the country. Due to the isolated location of the two districts there is a significant amount of border traffic with neighboring Zambia and Tanzania. Since, obviously, no records of private barter or sales exist it is difficult to estimate the volume of crop produce involved. The quantities purchased by ADMARC over the last five years are given in Table 1.

ADMARC

2. ADMARC was established in 1971 to take over the responsibilities of the former Farmers Marketing Board (FMB). It has the statutory responsibility of purchasing, processing and disposing of agricultural produce except for estate grown tea, tobacco and sugar. In fact ADMARC does not, and often cannot, exercise its right to purchase all crop surplus, allowing farmers to barter and sell amongst themselves. ADMARC's responsibilities also include the maintenance of food reserves to meet possible local shortages, the supply at cost or at subsidized prices of agricultural equipment and farm inputs, and limited marketing of petroleum products. ADMARC operates within the framework of general and special Government policy with the twin objective of ensuring a reasonable return to the farmers and to earn surpluses to support national development programs. ADMARC is responsible to the Minister of Agriculture and Natural Resources. It is, however, autonomous in its day to day operations and enjoys the full measure of financial and administrative independence necessary to enable it to exercise its functions as a commercial trading enterprise.

3. ADMARC recommends and the Government determines each year before the start of the new growing season guaranteed minimum prices for all crops which are uniform for the whole country. Usually this is done in September or

October and farmers are encouraged to choose the crops which would give them the best return. The prices may be increased in the course of the harvesting season (about April) if world market values have increased in the meantime but such corrections have in fact rarely been made. During the last few years the export values of most agriculture commodities have increased, but since the growers' prices are announced almost a year before ADMARC actually sells the produce the increases in growers' prices have tended to lag behind. Determining guaranteed prices involves, of course, certain risks but the increasing volumes of crops marketed outside the official ADMARC channels suggests that the Government may have been too cautious. The steep rise in the prices of fertilizers had an adverse effect on the relationship between gross returns and costs per acre, particularly for maize during the 1974/75 season (Table 3). The growers' share of the net sales value of crops purchased, which was on average 58% between 1969/70 - 1972/73, declined to 48% in 1973/74 and to 47% in 1974/75 (Table 4). The announced increases in minimum prices for the 1975/76 growing season (Table 2), amounting to 29% for maize and 7% - 12% for most other crops, are therefore justified and are expected to be high enough to maintain the farmers incentives. On the basis of international prices there seems to be room for further increases, however, especially for groundnuts and cotton.

4. ADMARC's annual net surpluses on crop trading have meanwhile increased substantially and reached MK 11.1 million in 1974/75. Tobacco contributed 44% to the net surplus (32% in 1973/74) and cotton 28% (18% in 1973/74). The contribution of maize to the 1974/75 net surplus was only 2% (19% in 1973/74). All net surpluses are transferred to the reserves. ADMARC's crop trading account and profit and loss account for 1974/75 and its balance sheet as of March 31, 1975 are in Tables 5, 6 and 7 respectively.

5. Under the Project ADMARC would construct nine permanent markets, combined with facilities to store and distribute farm inputs, as well as eight small input sheds in the Karonga-Chitipa area. It is obvious that ADMARC's efficiency and financial viability are important factors for guaranteeing a minimum return to the farmers from their crops. A certain amount of border trade is likely to continue in the Karonga and Chitipa districts since ADMARC cannot be expected to be able to compete with private traders for all crops at all times. But it is important that ADMARC should continue to work in the interest of the smallholders, including those living in isolated areas, and the timely availability of inputs as well as guaranteed reasonable minimum prices for the crops are essential for the success of the Project.

Crop Exports

6. Rice. Volumes and values of Malawi's recent rice exports are as follows:

	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>
Volume, sh ton	3,483	3,064	5,701	7,881	15,350	12,202
Value, MK'000	265	548	956	1,092	2,550	3,700
Average price, MK/sh ton	76	179	168	139	166	303

More than two third of exports were in the past to Rhodesia but more recently both Zambia and South Africa have purchased increasing quantities. At the present time the quantities that could be readily sold in these two countries exceed supply and South Africa, which traditionally imports its rice from the USA, offers the largest market. Malawi is given privileged tariff treatment in the Rhodesian market and to a maximum of 2,000 m ton this is also the case in South Africa. The import into Zambia is open to all countries, with the bulk of imports coming from Thailand. Before being exported, Malawi's rice is milled in one of the three rice mills which are operated by the National Oil Industries Limited (NOIL). The company, in which ADMARC has a 50% ownership, and thus effective control, mills the paddy on behalf of ADMARC at a fixed fee. One of the mills is located at Chilumba, in Karonga district. It has an annual capacity of 7,200 sh ton which is insufficient to mill the entire Karonga rice production, currently estimated at about 8,000 sh ton. Some paddy is therefore shipped to the new mill in Nkhotakota where spare capacity exists. A project for a new mill at Kambwe, 5 miles north of Karonga, has been prepared but no financing has as yet been secured.

7. Cotton. Recent exports of cotton lint were as follows:

	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>
Volume, sh ton	4,205	9,158	5,313	5,277	2,730	2,745
Value, MK'000	1,729	2,777	2,547	2,567	1,900	2,700
Average price, MK'000/sh ton	411	303	479	486	696	1,000

Exports were predominantly to three countries: United Kingdom, Rhodesia and South Africa. Malawi produces a variety of cotton, Albar 637, with a strong medium-to-long staple, which is suitable for modern spinning requirements, but has a low ginning percentage. The crop is grown entirely by smallholders, and is susceptible to erratic weather conditions, particularly in the main producing area, the Lower Shire Valley, in the south of the country. Seed cotton production exceeded 24,000 sh ton in 1971 and 1972 but was less than 18,000 sh ton in 1973. Karonga's production, which has steadily increased in the last few years, accounts for only 1 - 2% of Malawi's total. ADMARC has a contract with a privately owned ginnery at N'gara (southern Karonga) for the ginning of Karonga's cotton. The present capacity is about 600 sh ton of seed cotton per annum which can easily be expanded when necessary. The cotton lint produced at N'gara is transported by Lake and rail service to Limbe and is either exported or sold to a local textile mill, depending on quality and demand. Between 15 and 20% of the cotton seed produced at N'gara is retained for seed for the next season's crop. The balance is moved to Blantyre, where NOIL operates an oil expression plant.

8. Maize. Maize exports during recent years were as follows:

	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>
Volume, sh ton	52,144	1	5,073	40,606	47,650	34,170
Value, MK'000	2,132	-	411	1,302	3,450	n.a.
Average price, MK sh ton	41	-	81	32	72	n.a.

Most of past exports were to the United Kingdom but more recently an increasing proportion was sold to neighboring countries, Tanzania and Zambia. Total exports represent only a small part of Malawi's production since maize is grown as the principal food crop. The annual production is estimated at 1.2 million sh ton. Production in both Karonga and Chitipa falls short of requirements and it is estimated that unsatisfied demand may be about 2,000 sh ton in each district. Part of Karonga's shortfall is covered by maize which ADMARC supplies from Mzimba or Rumphi, located farther south in the Northern Region. Because of the high costs of transport involved ADMARC has, however, not supplied Chitipa district with maize from other areas. Occasionally, Malawi is forced to import maize because of crop failures. In 1970, a particularly poor year, 71,700 ton were imported mainly from Rhodesia and South Africa. The Government's policy in recent years has been to maintain self-sufficiency in maize. This entails producing a small margin of surplus to allow for poor harvests, estimated at about 7% of total national production. In view of the increased prices for maize there is ample reason for expanding production in certain parts of the country, e.g. areas particularly suited to maize production such as Lilongwe and Dowa, and in local deficit areas such as Karonga and parts of Chitipa.

9. Groundnuts. About 98% of groundnut production in Malawi is of Chalimbana type confectionery nuts, which earn a considerable premium over oil nuts on the export market. Exports of confectionery nuts during recent years were as follows:

	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>
Volume, sh ton	37,765	24,814	32,177	39,357	34,230	22,765
Value, MK'000	5,591	4,241	5,883	7,123	6,707	5,200
Average price, MK/sh ton	148	171	183	181	196	228

Some 85% - 90% of these exports were to the United Kingdom while most of the balance was sold to the Netherlands in the last decade. All confectionery groundnuts purchased by ADMARC are graded into four grades at the factory at Liwonde which has ample capacity. The crushers, together with the Manipintar oil nuts, are sold internally for oil expression to a private plant in Limbe. The domestic demand for nuts for groundnut oil is presently high, and is expected to expand. Some 4,000 - 5,000 sh ton have been used for crushing in recent years.

10. Coffee. Malawi coffee, which is almost entirely arabica, was at one time an important export of the country, and in 1908 over 450 sh ton were exported. Now, it is relatively less important, and in recent years exports have been less than 250 sh ton per year. Coffee's share in ADMARC's total annual sales has been less than one half of one percent in each of the last five years. The volume and values of coffee exports during recent years were as follows:

	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>
Volume, sh ton	199	150	255	163	180	218
Value, MK'000	100	102	161	84	140	n.a.
Average price, MK/sh ton	501	677	714	514	778	n.a.

The traditional export market is South Africa, although in recent years increasing consignments have been sent to the Middle East and Europe. Malawi, as an insignificant producer in world terms, does not subscribe to the International Coffee Agreement. Following the dissolution in 1975 of the Smallholder Coffee Authority, ADMARC has taken over responsibility for the operation and maintenance of all coffee pulperies, and the purchase of cherry, mbuni and village-processed parchment coffee from the growers. ADMARC continues to be responsible for transport of parchment to Limbe, where hulling, cleaning and grading take place.

February 15, 1976

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

ADMARC Crop Purchases in Karonga and Chitipa, 1970 - 1974
(sh ton)

	1970	1971	1972	1973	1974
<u>Karonga</u>					
Paddy rice	4,307	5,712	6,214	7,198	8,274
Seed cotton	173	70	198	247	320
Groundnuts	173	20	7	2	13
Maize	-	2	5	-	1
<u>Chitipa</u>					
Maize	310	343	180	252	444
Groundnuts	12	13	12	17	12
Pulses	1	18	12	27	36
Coffee <u>1/</u>	111	54	79	73	48

1/ Parchment coffee.

Source: ADMARC

January 15, 1976

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

ADMARC Prices for Selected Crops, 1971/72 - 1975/76 (tambala/lb)

	1971/72	1972/73	1973/74	1974/75	1975/76 <u>1/</u>
Maize	1.25	1.25	1.25	1.75	2.25
Cotton, grade A	5.5	5.5	6.0	8.0	8.5
Groundnuts <u>2/</u>					
- Chalimbana, GDA	6.0	6.0	6.5	8.0	8.5
- Malimba, Manipintar	4.0	4.0	5.0	6.5	7.0
Paddy, grade A	3.33	3.33	3.33	4.0	4.5
Beans	4.0	4.0	4.0	5.0	5.5
Coffee	3.33	3.33	3.75	4.0	<u>3/</u>

1/ Announced September 29, 1975 to become effective on April 1, 1976

2/ Shelled

3/ Not yet announced.

Source: ADMARC

January 15, 1976

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Budget for 1 Acre of Maize; Yield 2,400 lb
(MK)

	1972/73	1973/74	1974/75	1975/76
<u>Income</u>				
Official maize price per sh ton	25.00	25.00	35.00	45.00
Gross Return per ac	30.00	30.00	42.00	54.00
<u>Costs</u>				
1 bag CAN	3.30	3.30	8.50	8.50
1 bag 20.20.0	3.45	3.45	9.00	9.00
22 lb synthetic maize seed,	<u>1.10</u>	<u>1.10</u>	<u>1.10</u>	<u>1.10</u>
Sub-total	7.85	7.85	18.60	18.60
Credit charge: %	10.00	10.00	10.00	12.50
MK	<u>0.79</u>	<u>0.79</u>	<u>1.86</u>	<u>2.33</u>
Total costs	8.64	8.64	20.46	20.93
<u>Margin</u>	21.36	21.36	21.54	33.07
Benefit/Cost ratio	3.5/1	3.5/1	2.1/1	2.6/1

March 1, 1976

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

ADMARC Crop Trading Accounts, 1970/71 - 1974/75

	<u>1969/70</u>		<u>1970/71</u>		<u>1971/72</u>		<u>1972/73</u>		<u>1973/74</u>		<u>1974/75</u>	
	<u>MK'000</u>	<u>%</u>	<u>MK'000</u>	<u>%</u>	<u>MK'000</u>	<u>%</u>	<u>MK'000</u>	<u>%</u>	<u>MK'000</u>	<u>%</u>	<u>MK'000</u>	<u>%</u>
Purchase of Crops	10,074	56	13,538	65	13,959	51	16,477	58	14,343	48	17,157	47
Buying and direct expenses	3,110	17	3,727	18	3,992	15	4,943	17	6,036	20	7,114	19
Administrative expenditure	878	5	908	4	911	3	857	3	1,448	5	1,281	4
Net profit on crop trading	3,977	22	2,659	13	8,714	31	6,327	22	8,112	27	11,148	30
Net sales value of crops purchased	18,039	100	20,832	100	27,576	100	28,604	100	29,939	100	36,700	100
Sales of crops	19,175		21,084		27,612		29,226		33,479		38,042	
Selling expenses	847		926		901		1,652		2,271		2,176	
Sales less selling expenses	18,328		20,158		26,711		27,574		31,208		35,866	
Movement of stock - increase(decrease)	(289)		674		865		1,030		(1,269)		834	
Net sales value of crops purchased	18,039		20,832		27,576		28,604		29,939		36,700	

Source: ADMARC

January 15, 1976

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Agricultural Development and Marketing Corporation - Crop Trading Account for the Year Ended 31st March, 1975
(MK)

	COTTON	GROUNDNUTS	TOBACCO	MAIZE	RICE	CASSAVA	GENERAL PRODUCE	TOTAL
SALES	7,602,449	7,666,930	10,590,847	5,431,360	3,901,763	399,582	2,449,291	38,042,222
Deduct: Selling expenses								
Auction floor charges and cess	-	-	182,957	-	-	-	-	182,957
Insurance	19,465	66,395	-	5,525	4,566	3,807	10,118	109,896
Railage, freight and port charges	113,487	568,696	-	359,136	182,837	150,778	129,106	1,504,042
Bags, twine and hessian	-	114,731	-	234,287	-	-	30,718	379,736
	132,952	749,822	182,957	598,950	187,423	154,585	169,942	2,176,631
SALES LESS SELLING EXPENSES	7,469,497	6,917,108	10,407,890	4,832,410	3,714,340	244,997	2,279,349	35,865,591
Movement of stock-increase/ (decrease)	720,868	50,919	3,058	(324,313)	(140,150)	41,097	482,772	834,251
NET SALES VALUE OF CROPS PURCHASED	8,190,365	6,968,027	10,410,948	4,508,097	3,574,190	286,094	2,762,121	36,599,842
PURCHASE OF CROPS	3,413,928	4,524,058	3,362,132	2,868,097	1,577,230	177,697	1,214,008	17,157,150
BUYING AND DIRECT EXPENSES								
Marketing	318,051	376,527	665,323	237,209	225,946	18,154	88,786	1,929,996
Depot and storage	92,741	30,914	23,185	370,965	23,185	69,556	38,642	649,188
Bags, twine and hessian	121,647	31,494	28,855	91,004	88,197	10,623	18,938	390,658
Grading, ginning and baling	509,864	174,910	721,815	-	529,130	-	29,943	1,965,662
Transport of crops	173,691	505,035	215,693	425,935	320,839	924	72,862	1,714,979
Fumigation	7,574	3,632	14	48,306	9,795	9,523	18,743	97,587
Insurance - cash and crop	10,335	11,365	6,681	7,670	10,605	-	3,358	50,014
Seed distribution	138,661	3,657	149,996	4,026	652	-	258	297,252
Research contribution	-	19,000	-	-	-	-	-	19,000
	1,372,464	1,156,534	1,811,562	1,165,117	1,208,349	108,780	271,530	7,114,336
TOTAL PURCHASES AND BUYING EXPENSES	4,786,392	5,680,592	5,173,694	4,073,214	2,785,579	286,477	1,485,538	24,271,486
GROSS PROFIT/(LOSS)	3,403,973	1,287,435	5,237,254	434,883	788,611	(383)	1,276,583	12,428,356
NET ADMINISTRATIVE EXPENDITURE	247,109	208,233	326,168	213,377	217,559	19,585	48,888	1,280,919
NET PROFIT/(LOSS) ON CROP TRADING								
Transferred to profit and loss account	3,156,864	1,079,202	4,911,086	221,506	571,052	(19,968)	1,227,695	K11,147,437

Source: ADMARC

January 15, 1976

ANNEX 4
Table 5

MALAWIKARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Agricultural Development and Marketing Corporation
Profit and Loss Account for the Year Ended 31st March, 1975
(MK)

Profit transferred from crop trading account	11,147,437
Add: Other revenue and profit	
Dividend received	475,585
Interest received	1,789,407
Petroleum products - profit	7,474
Toleza farm - profit	<u>65,818</u>
	13,485,721
Less: Other expenses and losses	
Fertilizer and farmers aids (net)	694,589
Viphya Tung Estates - loss	205,226
Interest on long term loans	1,031,841
Provision for doubtful debts	205,000
Coffee authority - contribution	-
Miscellaneous projects	233,559
Grants and contributions	<u>243,459</u>
	2,613,674
	<u>10,872,047</u>
Less: Grant - Malawi Government	<u>56,000</u>
	<u>10,816,047</u>

Source; ADMARC

January 15, 1976

MALAWIKARONGA RURAL DEVELOPMENT PROJECT - PHASE IIAgricultural Development and Marketing CorporationBalance Sheet - 31st March, 1975

(MK)

Fixed Assets	9,427,875
Investment and Loans	15,776,966
Crop Reserve Fund	
Local registered stocks	5,000,000
Cash on deposit	-
Cash at bank	-
	<u>5,000,000</u>
Current Assets	
Cropstocks and livestock	2,953,282
Growing crops - development projects	579,208
Stores	4,065,567
Debtors	6,680,710
Short term investments	2,500,000
Cash on deposit	2,968,695
Cash at bank and on hand	7,571,096
	<u>27,318,558</u>
Current Liabilities	
Creditors and accrued expenses	<u>2,879,961</u>
Net Current Assets	<u>24,438,597</u>
	<u>54,643,438</u>
Financed by:	
Reserves	13,039,791
Crop reserve fund	5,000,000
Working capital account	26,859,416
Long term liabilities	<u>9,744,231</u>
	<u>54,643,438</u>

Source: ADMARC

January 15, 1976

MALAWIKARONGA RURAL DEVELOPMENT PROJECT - PHASE IIHealth FacilitiesA. BackgroundThe Health Situation in Malawi

1. Malawi shares with most of Africa severe problems in improving the health standards of its people. Medical services are poor in comparison with the more advanced and industrialized countries. This results to a large extent from scarce financial resources, and is compounded by limited availability of trained manpower. The main diseases contributing to the high mortality rate are communicable diseases, water-born diseases and diseases resulting from malnutrition. Measles, gastro-enteritis, whooping cough, tuberculosis, respiratory and parasitic infections are therefore quite common. Malaria is the most important cause of death in young children and is also responsible for high rates of mortality in school age children and particularly in the working population. Parasitic infections are believed to be an important contributory factor to low productivity. In addition, cholera has recently become endemic.
2. To spread the limited Government resources equitably throughout the country is a difficult task. Ninety per cent of the population lives in the rural areas and emphasis is given to preventive rather than curative treatment. Although the proportion of the Government's recurrent budget for health expenditures is quite high (about 7.5% in 1974/75 ^{1/}), the annual per capita expenditure is only about 80 tambala - or less than US\$1.00.
3. The majority of Government operated facilities are located in the Southern Region, the other Regions being served primarily by missions. Given the overall shortage of health care facilities, the role of religious missions is of great importance. The Private Hospital Association - a federation of mission authorities - receives a subsidy from Government and has an office in the Ministry of Health. Of the total hospital beds available in the country, approximately 45% are operated by missions. Of beds in hospitals without doctors, 73% are run by missions.
4. Since private hospitals charge fees for in-patient and sometimes for out-patient care, occupancy rates are lower - perhaps 50 - 60% as opposed to about 120% in Government hospitals where -except for a nominal

^{1/} Source: IBRD/IDA 1974 Economic Updating Mission

charge for maternity care, all services are free. Free Government health care does not seem to lead to profligate dispensation of drugs: the average patient visit to a Government dispensary costs only 4 tambala for medicines prescribed.

5. The preliminary results of a December 1973 study highlights the shortage of medical and paramedical personnel. There are only 106 medical officers (MD or equivalent) in the whole country - or one for every 45,000 Malawians - and, of those, 93 are foreigners. Non-Malawians also occupy heavily other senior medical positions: 47% of State registered nurses, 84% of pharmacists, 42% of laboratory technicians, 67% of radiographers and 63% of dentists.

6. All doctors are trained abroad, but most nurses and mid-wives graduate either from the National School of Nursing, Blantyre, or the Enrolled Nurse Training School, Zomba, or are trained by various missionary agencies in the rural areas. Medical assistants, who will become of increasing importance in the rural health sub-centers and health posts, are currently trained at the Medical Assistance Training School in Lilongwe. At present, about 40 Malawians are abroad for training as doctors and return at the rate of about 4 per annum. A job description of the various health staff is at Appendix 1.

7. In 1971, a World Health Organization (WHO) planning team prepared a report "National Health Planning, Malawi", which was generally accepted by Government as a guide to future development of health services in the country, although some specific recommendations, such as regional decentralization, were rejected. The report proved to be complementary to an earlier accepted report prepared with the assistance of an IDA consultant.

8. Some of the more important recommendations of the study included:

- (a) upgrading of health personnel to encourage adequate supply of staff;
- (b) new and enforceable legislation on the collection of vital statistics;
- (c) implementation of health laboratory services for control of specific diseases on a national, regional and district level including malaria, schistosomiasis, smallpox, venereal diseases, tuberculosis, leprosy and childhood diseases;
- (d) formulation of new health legislation;
- (e) establishment of a National Health Planning Unit;
- (f) introduction of a cost accounting system to trace expenditures on individual programs more accurately; and
- (g) the encouragement of lending agencies to include health components in agricultural development programs.

9. A number of these proposals have already been instituted: a National Planning Unit has been established, mass vaccination campaigns have been initiated and health components have been incorporated in each of the three IDA supported agricultural projects.

10. In addition, the WHO report proposed a hierarchy of health facilities consisting of primary health centers, sub-centers and health posts, based on the principle of the higher units supervising the lower and the lower referring patients to the higher. At full development each 50,000 people would be served by one primary health center, four health sub-centers and 20 health posts. A description of the previous and future structure with its functions is given in Appendix 2.

11. It is unlikely that the proposed pattern will be fully established in the near future, since the recurrent costs and staffing needs would place an impossible burden on the limited resources of the Government.

B. Karonga Rural Development Project

Justification for the Inclusion of a Health Component

12. Since Rural Development projects are far reaching in their effects, and demanding on the resources of the community, they should not only develop the physical resources, but also the human resources. One of the objectives should therefore be the improvement of the working capacity and environment.

13. The economic value of health expenditures in a country like Malawi is evident; the problem is to quantify the benefits. Agro-economic surveys in two villages in north Karonga revealed that considering specific work categories, 22% of the time was spent for the category "illness" which includes attending health facilities, visiting and tending sick persons or participating in funerals. A survey at Hara Irrigation scheme found that 10% of male household heads' and 20% of wives and female household heads' time was consumed by "illness".

14. No studies on the effect of ill health have been conducted in Malawi. However, there is no reason why the situation should be any different from other countries with similar problems and where surveys have found a marked correlation between improved health and higher productivity. Ill health is known to cause weakness, and to contribute to lack of concentration and initiative; available man/days of labor would consequently be lower. Parasitic infections are widespread and often lead to anemia.

15. A rough estimate can be made of the economic loss arising from mortality among school children. In Chitipa, 1973/74, 10,581 children between the ages of 6 and 13 were enrolled at primary school. The population change survey indicates that about 1% of these children will die every year. Assuming that death is evenly spaced between these ages, those who die, are

likely to have an average three years of schooling. At a cost of MK 12.0 per pupil per annum, 2.4% of the annual primary school budget in Chitipa will be wasted.

16. The establishment of rural health posts concentrates on preventive aspects of health such as teaching mothers proper nutrition and hygiene. Statistics from 1973 revealed that 34% of children in Karonga and 40% in Chitipa were under-weight.

17. Maternity units help to ensure that mothers and their babies remain healthy. In Malawi, women play an important role in the daily work. An agro-economic survey of north Karonga established that in the categories field work, after harvest, marketing, livestock care, construction and maintenance, other work, and housework, male heads of households did 36% of the total hours worked, and wives and female heads of households, 64%. Even if housework is omitted, the percentages are 53% and 47%. Frequent pregnancies accompanied by a lack of ante-natal and delivery care can seriously affect the health, stamina and strength of the women. This in turn affects the health of the children and the prosperity of the family. Moreover, ante-natal clinics could detect problems at an early stage which in turn would reduce expensive treatment at a later stage.

18. However, the case for health expenditures must also include the social benefit. To judge from the enthusiasm with which the rural population, particularly in Chitipa, have embarked on self-help improvements to health services, it is clear that the people pay high priority to medical services.

Phase I

19. With the above in mind, the Phase I project provided funds for the construction and operation of five rural health posts and improvements to the Chilumba Rural Hospital and the Karonga District Hospital. During execution some of these plans were modified. In addition, the project established a bilharzia control unit under the supervision of the Senior Extension and Settlement Officer to perform regular services at the irrigated rice schemes (including Hara and Wovwe).

Phase II

20. Since only a small portion of the development considered necessary has been covered so far, it is proposed that Phase II provides further improvements in the Karonga district and an expansion of activities in the Chitipa area.

Existing Health Facilities

21. Throughout Malawi health services are provided by a combination of Ministry of Health, missions and Districts Council Units. In Karonga and Chitipa the following facilities exist:

(a) Karonga

<u>Location</u>	<u>Type</u>	<u>Agency</u>
Karonga	District Hospital	MOH
Karonga	Maternity/Dispensary	Mission
Chilumba	Primary Health Center	MOH
Chilumba (St. Anne's)	Maternity/Dispensary	Mission
Kaporo	Primary Health Center	MOH
Kaporo	Dispensary	MYP
Nyungwe	Subcenter	MOH
Lupembe	Dispensary	District Council
Mpata	Dispensary	MOH
Songwe	Dispensary	MOH
Sangilo	Dispensary	Mission
Ighembe	Health Post (under construction)	MOH
Mlali	Health Post " "	MOH
Mwanjasi	Health Post " "	MOH
Kasowa	Health Post	MOH

There is also a maternity operated by Rumphi District Council at Chitimba, a few miles south of Chilumba, and a large mission hospital at Livingstonia, though access to this hospital is difficult from the Lake shore.

(b) Chitipa

<u>Location</u>	<u>Type</u>	<u>Agency</u>
Chitipa	District Hospital	MOH
Kaseye	Hospital	Mission
Misuku	Dispensary	MOH
Ifumbo	Dispensary	MOH
Ifumbo	Maternity	District Council
Kameme	Dispensary	MOH
Kapenda	Dispensary	Mission
Chambo	Dispensary	Mission
Wenya	Dispensary	MOH
Wenya	Maternity	District Council
Nthalire	Dispensary	MOH
Nthalire	Maternity	District Council

In addition, mobile clinics make visits all year round at Kapoka and Chisenga, and at Kopakopa, Sokora and Mughese when the roads are passable.

Details of Proposed Improvements

22. (a) Karonga: additional outpatient facilities in Karonga district are not of high priority, but the existing dispensaries need to be upgraded to centers similar to the new Nyungwe sub-center, constructed under Phase I.

(i) Kaporo Primary Health Center: this unit is being renovated under Phase I. In order to function adequately as a primary health center, it needs a 4-wheel drive vehicle which will be used for supervisory work, running mobile clinics, and carrying patients;

(ii) Mpata, Songwe and Lupembe: these three units consist only of dispensaries, and no improvements were effected under Phase I. Songwe is 10 miles from Kaporo and very isolated, communications with Kaporo often being difficult. Mpata is about 12 miles from Karonga and is a focus for agricultural development. Lupembe, similarly, is an important development area with a population of more than 20,000 in the vicinity of the health unit. It is proposed to add to each a 6 bed maternity unit including a waiting/demonstration/teaching area, houses for a midwife and an adequate water supply for Mpata and Lupembe;

(b) Chitipa: no funds were provided under Phase I for this district. To help improve present coverage, the following places are included in the cost projections:

(i) Misuku: the Misuku area contains about 20,000 people, and the numbers attending the dispensary are relatively high. Additional health facilities are obviously needed, and it is considered that these can best be provided by upgrading the dispensary to include a maternity unit, and by stationing a 4-wheel drive vehicle and an extra medical assistant and nurse/midwife at Misuku, to run regular mobile clinics in the surrounding villages. The vehicle would also be of great use in transporting patients to the hospital. Housing will be needed for these staff and for a health assistant whose present house is sub-standard. Adequate water supply to the health unit also needs to be provided. There will also be a health homecraft worker with training in nutrition and maternal and child health;

(ii) Ifumbo: there is already a dispensary and maternity at Ifumbo, but houses are needed for the medical assistant and for a health assistant;

- (iii) Kamene: the dispensary at Kamene caters for about 8,000 people, and is 15 miles from the nearest unit. A maternity unit, and houses for a midwife and health assistant are needed;
- (iv) Wenya and Nthalire: Both these units need health assistants, and thus housing, and Wenya needs a borehole at the health unit;
- (v) Health Posts: these are proposed for the following places:
 - (a) Sokora: this is 36 miles from Chitipa but only 10 miles from Misuku and could be one of the stopping places for the Misuku mobile team. A clinic is held at Sokora at present by Chitipa hospital when the roads are passable;
 - (b) Kapoka: this again is the site of an existing mobile clinic. It is 17 miles from Chitipa, and 17 miles from Misuku;
 - (c) Ipenza: a health post is needed in the far western tip of Chitipa, probably at Ipenza;
 - (d) Chisenga: the only health facilities in this area are provided by a small mission dispensary. The low population density does not justify the expansion of this dispensary, but a health post would provide a valuable supplement to this service;
 - (e) Kavukuku: a health post at Kavukuku will bridge the distance between Wenya and Nthalire sub-centers, and will provide a service at an agricultural center;
 - (f) Kopakopa: Kopakopa is very isolated, and justifies a health post. The mobile clinic can be run by the vehicle from Nthalire;
 - (g) Therere: a health post at Therere would provide a useful service to people living south of Nthalire.

Mobile Clinics

23. Existing health units will be encouraged to run mobile clinics, using whatever transport is available. In this way, the main catchment area of the unit, normally reckoned to have a radius of 5 miles, can be doubled. The clinics, other than those held at the health posts to be constructed under the Project, will be held in any available building, and the local people will be encouraged to build clinic shelters.

24. There are also funds provided for drugs and medicinal expenditures.

Bilharzia (Schistosomiasis)

25. This disease is caused by a micro-organism living in the blood vessels of the bladder (urinary type) or of the intestines (intestinal type); the former type comprises about 80% of the cases in Karonga. The damage caused is greatly dependent on the severity of the infection but may debilitate its sufferer considerably and can eventually affect the bladder, ureters and kidney. Once established, further progress of the disease can be stopped by treatment but any damages are irreversible and sometimes fatal. Possibly half of the people in Karonga are affected.

26. Transmission occurs as follows: the parasites in the bladder or intestines produce eggs that leave the human body in urine or stools. If these are deposited in water (as often happens, directly or indirectly), the parasite will look for certain types of snails in which to develop further. These snails are found in fresh, stagnant water, especially if reeds and grasses are growing in it. After five to six weeks, the bilharzia parasite leaves the snail and floats freely through the water looking for a human body, which it penetrates through the intact skin on its way to the blood vessels of bladder or intestines.

Bilharzia Control

27. The Project would continue bilharzia control based on the killing of the intermediate host of the parasite, the snail. Procedures would be as follows:

- (a) it is uneconomical to start treating the water before the human bilharzia carrier snail is present, and some skill is required to recognize it. A search should be made in the irrigated areas, the non-irrigated areas, and in the streams through the latter. Experience shows that even if no snails are present at the first examination, they are bound to appear sooner or later;
- (b) water can be treated in various ways. If it flows at a reasonable speed, a chemical molluscicides can be drip-fed in the main canals. If the water is standing, the chemicals should be sprayed on the water;
- (c) two main chemicals are available as molluscicides: "Frescon" and "Bayluscide". Frescon is easy to spray and is given in a low dosage, thus facilitating transportation. The drug is safe to use, but it does not kill the snails' eggs. Treatment therefore has to be repeated. Bayluscide does kill the eggs but until recently was harder to dispense. However, Bayluscide has now become available in an easy-to-dispense form. Costs of the two treatments are about the same, and which chemical to use depends on many local circumstances; the dosage depends on the amount of water and the flow rate;

- (d) about every two weeks, the water has to be examined for snails again and if the population has increased, retreatment is required. The rate of increase of snails determines how soon another examination will have to be carried out; and
- (e) certain strains of snails are resistant to desiccation, others are not. The irrigated areas will be dry once a year for one month and the non-irrigated areas will be dry from June to November. It will be necessary to investigate the effect this period of drought in the non-irrigated areas has on the snails. The short dry periods in the double-cropped irrigation schemes will probably not be detrimental to them.

C. National Rural Development Program

28. Under the proposed preinvestment phase there will also be funds provided for the N.W. Mzimba NRDP sub-project. This area is estimated to contain a population of about 58,000 people. According to the standards adopted by the Ministry of Health, it should, therefore, have one primary health center and four sub-centers. However, these standards need modification for areas of low population density, keeping in mind the rule that no one should have to walk more than 5 miles to a health center. In the Project area, where the population density per square mile is on average about 90, this means one sub-center for every 7,100 people.

29. With regard to dispensaries, this standard has already been achieved, though their distribution over the Project area is not ideal, and their facilities are minimal. None of the dispensaries are fully fledged sub-centers and are unable to carry out the full range of preventive activities that are considered desirable; the emphasis is inevitably on curative care.

30. A comprehensive development project in the area would thus concentrate on developing the existing dispensaries into full sub-centers, and on setting up a primary health center to supervise and service the sub-centers. This comprehensive development approach would be too expensive for this Project and, moreover, would over-commit the Ministry of Health's resources.

31. Therefore, the Project would concentrate on up-grading one dispensary to sub-center status. The dispensary selected is at Mzalangwe, near M'Mbelwa Farm Institute, since it is centrally situated in the Project area. The up-grading will consist of the addition of a guardian shelter/demonstration kitchen, maternity unit and houses for an Enrolled Nurse/Midwife and Health Assistant to the existing dispensary. A borehole will also be constructed.

32. Details of the cost estimates for the KRDP health component are in Annex 8, Table 13 and for NRDP in Annex 8, Table 23.

February 15, 1976

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Job Description of Health Staff

Clinical Officer (TO)

1. The Clinical Officer is a senior medical auxiliary. He will be the officer-in-charge of a Primary Health Center, and his main function, in consultation with the District Medical Officer, will be to supervise and manage the basic health services within his area.

Registered Nurse (TO)

2. The Registered Nurse is a professional nurse with a training that includes a public health component. The Registered Nurse is part of the supervisory team of the Primary Health Center, and her particular responsibilities are maternal and child health services, and health and nutrition education.

Health Inspector (TO)

3. The Health Inspector is responsible for personal and environmental preventive measures within his area. As a member of the Primary Health Center supervisory team, his function is to direct the Health Assistants.

Medical Assistant (TA)

4. The Medical Assistant is an auxiliary worker trained in the diagnosis and treatment of disease. He is the officer-in-charge of a Sub-center, and provides the out-patient treatment service and under-five clinics.

Enrolled Nurse/Midwife (TA)

5. The Enrolled Nurse/Midwife is responsible for the maternal and child health services of a Sub-center, and assists with under-five clinics. She attends deliveries in the maternity unit, and undertakes domiciliary visits.

Health Assistant (TA)

6. The Health Assistant is the basic preventive health worker, responsible for health education, environmental health (e.g., protection of water supply) and personal preventive measures (e.g., follow-up of T.B. defaulters).

Hospital Servant (SC)

7. The Hospital Servant is an untrained worker who performs domestic task and provides simple nursing care. Female servants assist with deliveries. They are not personal servants of the staff.

Homecraft Worker (TA)

8. The Homecraft Worker in the health services is a primary school leaver of standing in the local community. She provides health education, especially on nutrition, child care and home hygiene subjects. She has simple first aid skills, but is expected to refer all serious cases for further attention. She assists with out-patients, ante-natal and under-five clinics.

February 15, 1976

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Health Unit Description

Previous Structure

District Hospital

1. The main Ministry of Health hospital in an administrative district, with a medical officer in charge. Usually has 50-150 beds, operating theatre, X-ray and laboratory.

Rural Hospital

2. Smaller Ministry of Health hospital, with a clinical officer in charge. Usually has 20-30 beds in male, female and maternity wards, but lacks theatre and X-ray. In future planning, most Rural Hospitals will be graded as Primary Health Centers; see below.

Mission Hospital

3. Range comprises both the above (and sometimes smaller units with beds). Mission Hospitals fall outside the structure of Ministry of Health types, and operate with substantial independence.

Dispensary (Government units have been recently retitled
Rural Health Centers)

4. A unit providing simple out-patient treatment given usually by a Medical Assistant. Most now also provide a regular under-five clinic.

Maternity Unit

5. A unit providing beds for lying-in mothers and a delivery room under the care of an auxiliary midwife. Some units also provide ante-natal care and under-five clinics.

Structure Proposed by WHO Report

District Hospital

6. As above, District Hospitals will also act as the Primary Health Center for the local area, but require additional staff to carry out the necessary supervision.

Primary Health Center

7. The Primary Health Center is at the apex of the basic health services structure. As an independent unit, it has 16 beds (10 maternity, 6 holding beds) and a staff consisting of:

- 1 Clinical Officer
- 1 Registered Nurse
- 1 Health Inspector
- 1 Medical Assistant
- 2 Enrolled Nurse/Midwives
- 1 Laboratory Assistant
- 1 Driver
- 3 Servants

In addition to providing services identical to those of the Sub-center directly to its immediate locality, it is staffed to provide referral and supervisory services to the Sub-centers and Health Posts within its jurisdiction, an area containing a population of about 50,000.

Health Sub-center

8. The Sub-center is the basic unit of the system at which curative and preventive services are integrated. It is designed to serve a population of 10,000 with out-patient treatment, under-five clinics, ante-natal care and delivery service, health education and communicable disease control measures, provided by a staff consisting of:

- 1 Medical Assistant
- 1 Enrolled Nurse/Midwife
- 1 Health Assistant
- 1 Homecraft Worker
- 2 Servants

The first three of these staff constitute the clinic team which visits the health posts to provide a weekly clinic and to supervise the Homecraft Worker.

Health Post

9. The Health Post is the smallest unit in the structure, serving a population of 2,000 in its immediate locality. It consists of a house for the Homecraft Worker, with an extended shelter for teaching and holding the weekly clinic. The Homecraft Worker provides health education, particularly nutrition, child care and home hygiene, does home visiting, and assists with the weekly clinic. She has simple remedies to treat minor illnesses and injury on a first-aid basis. Some health posts are unmanned.

Health Unit

10. The WHO recommendations for planning basic health services are based on a Health Unit serving a population of 50,000. Each Health Unit at full development will consists of:

1	Primary Health Center	1	:	50,000	population
4	Health Sub-centers	1	:	10,000	population
20	Health Posts	1	:	2,000	population

N.B. The primary Health Center provides the Sub-center services to the adjacent 10,000 population. The Primary Health Center and 4 Sub-centers provide the Homecraft Worker service to the adjacent 2,000 population.

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Staff Training and Requirements

A. Staff Training

Bunda Agricultural College

1. Bunda Agricultural College, located near Lilongwe, is one of three constituent colleges of the University of Malawi and offers a three-year course leading to a Diploma in Agriculture. A separate four-year course leads to a Bachelor of Science in Agriculture degree. The first year of basic science of the degree course is undertaken at Chancellor College, near Zomba, followed by three years at Bunda. The degree course is being increased to five years.
2. Commencing in 1966, by 1975 there was an enrollment of 225, of which 163 were in the diploma course and 62 enrolled in the degree program. In all, degrees had been awarded to 46 students and diplomas to 289 students. In addition, 78 certificate holders from Colby College had been upgraded to diploma standard. Graduations in 1975 were 42 diplomates and 15 degree graduates, and 55 diplomates and 21 degree level are expected to graduate in 1976. There are no student intake problems as applications from qualified school learners greatly exceed capacity and their educational standard meets or exceeds Malawi Certificate of Education (MCE) examination requirements and is improving each year.
3. Job opportunities greatly exceed the supply of graduates at both diploma and degree level. There were 167 job offers for 57 graduates in 1975, of which 51 were employed by MANR. Of these, 23 (mainly diplomates) accepted openings within the Research Department, and only five were recruited by Extension and Training where the need is greatest. Recent discussions with the University are expected to result in increased recruitment by the Extension Department in subsequent years. Many other vacancies remained unfilled within MANR, and also for secondary school teaching, ADMARC and the private sector.
4. USAID and the UK Overseas Development Ministry (ODM) have been giving considerable assistance to the University and last year an AID mission reviewed requirements ^{1/} and has under consideration proposals for an expansion of facilities, to meet the following enrollment and graduation numbers:

^{1/} Requirements Analysis for Developing the University of Malawi's Bunda College of Agriculture, 1975-80; USAID, September 1974.

	<u>1975</u>	<u>1976</u>	<u>1980</u>
Total Enrollment	207	234	364
<u>Graduation</u>			
Diploma	42	55	60 <u>1/</u>
Degree	<u>15</u>	<u>21</u>	<u>30</u> <u>1/</u>
Total	57	76	90

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- 1/ The proportion of diplomates and degree graduates would vary. The program for the first three years would be the same for both diplomates and degree students. The number entering the 4th and 5th years for the degree would vary from year to year.

The aid mission also suggested that needs for additional expansion be reviewed again in 1977. It considered that if the need was confirmed, capacity could be further increased to about 450 students without excessive additional expenditure.

Colby College of Agriculture

5. The College was formed in 1967 by combining the Colby School of Agriculture with the Likuni Farm Institute, both located near Lilongwe. It offers a two-year course leading to a Certificate in Agriculture, which is the basic requirement for MANR Technical Assistants (TA). The intake is about 180 students in the first year at Likuni campus of whom about 160 proceed in the second year at Colby. The minimum student entry standard is a full Junior Certificate in Education (10 years of basic education). In 1975 there were several thousand applications for 180 openings. About three quarters of those admitted had MCE qualification. In 1975 159 students were awarded certificates. Employment opportunities exceeded the number of graduates and all were posted. MANR recruited about 135, of whom some 60 entered the Extension Service. The more isolated Northern Region, ADMARC and the private sector failed to recruit their requirements.

6. Colby also offers a course in home economics and eight women entered this year. However, the Thuchila Farm Institute, in the Southern Region, is the main training center for women with an intake of about 25 students per year. The one-year course leads to a Certificate as Farm Home Instructress.

7. Veterinary Assistants are trained at Mikolongwe School and Live-stock Improvement Center, near Blantyre. The school is operated by the Veterinary Department of MANR and offers a two-year course of similar standard to Colby, which leads to certification as Veterinary Assistants. The student output of 35 this year failed to meet demand. Intake of students has been increased to 50 and an output of about 45 VA's is expected after next year.

The Proposed Natural Resources College (NRC)

8. The purpose of the proposed NRC would be to combine the existing Colby, Thuchila and Mikolongwe Colleges to provide vocational training for field level workers for MANR and associated organizations. Capacity is planned for 580 students undertaking a two-year course leading to certification as Technical Assistants, Veterinary Assistants or Farm Home Instructors. The annual output is projected at 270 of whom 50 would be women. Little change would be made in the output of TA's and VA's but the number of FHI's would be doubled.

9. The College would be located at Likuni Campus of Colby College, where 400 adjacent acres have been acquired and 380 acres would be used as a teaching farm. The facilities will be planned to permit subsequent expansion of capacity if required. Advantages of the new College would be to provide a higher standard of training, to allow more coordination between agriculture and animal production and to develop a better understanding between the disciplines. The College would also provide the flexibility that will be needed to meet changing needs for trained staff in the years to come, and should lead to economies in operating costs. The establishment cost has been estimated at MK 6.6 million. The proposals are finalized for submission to potential donors.

In-Service Training

10. Training courses for the lower level Development Assistants, and refresher courses for trained staff are frequently held at the 22 odd Residential Farmer Training Centers and at the Farm Institutes in each Region. The ongoing major projects also provide various training programs. The planning unit of MANR has a three-year post-graduate training program, including overseas fellowships leading to a Master of Science Degree. Three have already completed this training and it is planned to send four officers overseas for post graduate work each year. Training in accountancy is undertaken at the Staff Training College at Mzemba, the Training Center at Zomba and at MANR Headquarters. The output of in-service training is not quantified but it undoubtedly adds considerably to resources of trained staff.

B. Requirements of Trained Manpower

11. No comprehensive survey has yet been made of MANR's changing requirements of trained manpower over the next 15-20 years but the Ministry is working on the problem. Meanwhile, the available evidence suggests that the supply of TA level field workers should be reasonably adequate but there will be a shortage of professional and technical officers for some time to come.

Technical Assistants

12. The field staffing aim of MANR is to achieve on average a ratio of one field worker of TA level to about 500 farm families by about 1995. This aim enables requirements of TA field workers to be projected approximately, and this has been done in the draft report on the proposed Natural Resources College. Three groups are projected separately (Table 1). First, the Field Assistants (TA), who are in direct contact with farmers. Second, the Farm Home Instructresses and female Field Assistants who are also in direct contact with farm families. It is projected that there will be about 1 FHI to 5 TA's and the combined total is regarded as the field force for the farm family/TA ratio. Third, there are the other TA's not directly involved in extension duties, e.g., research, field survey and teaching. Since these positions must be filled from Colby College (or the proposed NRC) their requirements have been projected separately.

13. No information is given concerning the assumed rate of implementation of NRDP projects, other than that the program is planned to affect all areas of the country before 1995. The planned requirement of trained recruits would fully absorb Colby's output and no allowance has been made for private sector employment. No doubt adjustments could be made to NRC throughput and the future supply/demand position for Technical Assistants should not be a serious limiting factor to the execution of NRDP.

Technical and Professional Officers

14. The USAID mission was concerned with the training of higher level Diplomates (Technical Officer) and Graduates (Professional Officer). The AID mission was unable to make a definitive study of manpower needs, but was convinced from a review of reports that "the number of Malawian diplomates and graduates available in the country does not begin to meet current requirements, much less an expanding future demand." MANR's "Projection of Demand for Graduates and Diplomates," (1973), was among the reports examined by AID. Staff demand projections are based on varying annual growth rates averaging about 4-1/2%, which are derived from budgetary considerations, and are not related to anticipated staff requirements arising from NRDP. The likely recruitment needs of the private sector also received very slim consideration.

Subject to these reservations, the projections indicated that after shortages for the next two or three years, a Bunda output of 28 Graduates and 55 Diplomates would reasonably meet the requirements of MANR and the Ministry of Education until 1985. The AID mission recommended a student capacity for Bunda of 365 by 1980, which would give an annual output of about 60 diplomates and 30 graduates. It is not clear how this output relates to the needs of NRDP.

15. The MANR projection (1973) estimated the staffing position of MANR and the Ministry of Education (MOE) for diplomates and graduates in 1973 and at the end of 1975, as follows:

	<u>Total Posts Established</u>		<u>Posts Held by Malawians</u>		<u>Posts Held by Expatriates or Vacant</u>	
	<u>1973</u>	<u>1975</u>	<u>1973</u>	<u>1975</u>	<u>1973</u>	<u>1975</u>
Diplomates	314	345	258	313	56	32
Graduates	142	156	60	88	82	68

The shortfall of Malawian diplomates was expected to decrease from 56 in 1973 to 32 over two years, so that the shortage from existing establishment is not unduly perturbing. The shortfall of Malawian graduates was expected to decline from 82 (58% of established posts) to 68 (44%) and there will be a serious shortage of Malawian Professional Officers for several more years.

16. The MANR studies now being undertaken should give priority attention to projections of additional requirements of both newly trained and experienced Professional and Technical Officers that will be needed for the effective implementation of the NRDP over the next 20 years. Pending availability of these data, some indication of the magnitude of the problem can be gained from a recent informal study ^{1/} of the staff needs of the Department of Extension and Training (DET), which would be responsible for executing NRDP; it is here that most of the demand for additional technical and professional staff will arise. The Department is at present particularly short of staff who have adequate experience for the posts they hold. This has come about largely because the Department during recent years has been the reservoir of agriculturalists trained in field work at various levels. These have been drawn upon by promotion to fill new posts in the major projects and other expanding activities. However, staff needs on the major projects are being largely met and they will not have important demands for additional staff as they are phased out to become regional management units of NRDP.

^{1/} Suggested Development of Extension and Training Department Staff, 1975-1980.

17. Most of the demand for additional technical and professional staff will therefore fall upon DET. Table 2 gives a breakdown of the Department's staff establishment for 1962 and 1974 and a projected establishment for 1980. During the 12 years ending 1974, the number of professional posts increased by five only, and the Department was unable to fill many of the 50 additional technical positions. While DET lost responsibility for about 22% of the country to the major development projects, the increase in staff in post was minimum although extension activities intensified during this period. New activities included development of a comprehensive system of farmer training centers, the inclusion of animal husbandry in extension work and the growing complexity of extension work as crop husbandry practices improved. It is clear, therefore, that the current staff resources of DET are under considerable strain.

18. The projected establishment for 1980 carries 21 additional graduate and 122 more diplomate positions. There is a high incidence of vacancies against the 1974 establishment and the number of expatriates filling positions is expected to decline. Consequently, it can reasonably be assumed that an average of about 30 graduates and diplomates would have to be recruited annually to fill the 1980 establishment of the Extension Department. It appears unlikely that this gap can be filled and the overall manpower situation of the Ministry requires therefore careful consideration in determining the rate of implementation of future NRDP sub-projects.

February 15, 1976

MALAWIKARONGA RURAL DEVELOPMENT PROJECT , PHASE IIProjection of Requirements and Availability of Technical Assistants

	1975 ^{1/}	1980	1985	1990	1995
<u>Number Rural Households,'000</u>	1,002	1,088	1,181	1,277	1,372
<u>Projected Staff Requirements:</u>					
Field Assistants (TA)					
Households/TA	900	775	700	640	600
Requirements	1,113	1,404	1,687	1,995	2,287
Farm Home Instructresses (FHI)					
Household/FHI	10,000	6,000	4,000	3,450	3,000
Requirements	100	181	295	370	443
Other Agricultural TA's					
Household/TA	4,000	3,000	2,500	2,400	2,300
Requirements	<u>250</u>	<u>363</u>	<u>472</u>	<u>532</u>	<u>596</u>
Total Requirements all Agricultural TA's	1,463	1,948	2,454	2,987	3,326
Planned Output Trained Recruits	170	230	230	230	230
Expected Number Employed January 1st ^{2/}	1,339	1,921	2,478	2,880	3,175

^{1/} Actual figures.^{2/} Assumes a wastage rate of 5%.

December 30, 1975

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT , PHASE II

Staff Establishment of the Department of Extension and Training

	1962	1974	Projected 1980
Superscale (S)	7	10	16
Professional Officer (PO)	<u>23</u>	<u>25</u>	<u>40</u>
Sub-total Professional	30	35	56
Chief Technical Officer (CTO)	6	13	26
Senior Technical Officer (STO)	6	12	22
Technical Officer (TO)	<u>61</u>	<u>98</u>	<u>197</u>
Sub-total Technical	73	123	245
Senior Technical Assistant (STA)	43	21	95
Technical Assistant (TA)	<u>706</u>	<u>748</u>	<u>1,186</u>
Sub-total Technical Assistants	<u>749</u>	<u>769</u>	<u>1,281</u>
TOTAL	<u>852</u>	<u>927</u>	<u>1,582</u>

December 30, 1975

MALAWIKARONGA RURAL DEVELOPMENT PROJECT - PHASE IINational Rural Development ProgramBackground

1. The concept of a National Rural Development Program (NRDP) emerged from discussions between officials of the Ministry of Agriculture and Natural Resources (MANR) and the World Bank on the impact of the major agricultural projects in Malawi and the possibility of extending these projects to other areas of the country. The heavy capital outlay required for the major projects weighed against the idea of extending them over the whole of Malawi within a reasonable time period. It was concluded that a change of emphasis was needed to assure a more rapid and a more equitable expansion of development activities and benefits. A target period of approximately 20 years has now been set and during that period rural development activities would either commence, or be further supported, in all areas of the country. It was further agreed that development in any given area would be phased and that in a first stage emphasis would be placed on investments with an immediate impact on agricultural production. Other investments, which are unlikely to have a substantial immediate bearing on production, would be made at later stages.

2. Under NRDP the sequence of events in any given area would be roughly as follows:

- (a) The activities would start with a two or three year preparatory phase. This would include land and agro-economic surveys, followed by detailed physical and economic planning and the establishment of agronomic trials where necessary. This phase would be concluded with the construction of additional housing and the allocation of new extension staff to minimize delay in implementing the next phase of development. A start would also be made with the construction of additional water sources, marketing facilities, rural roads and health posts whenever existing facilities are found to be clearly inadequate.
- (b) The next phase, tentatively called extensive phase, would be implemented over a period of about five years and would include investment in production related items such as improved extension and training, marketing, supply of inputs and credit. The construction of essential supporting infrastructure, started in the preparatory phase, would be completed during the early years of the extensive phase.

- (c) During a following five-year phase, called intensive phase, more attention would be given to research and introduction of new crops and processing technologies, the intensification of cropping programs, opening up of new areas--where available--for settlement, land conservation and consolidation, animal husbandry, and the construction of new roads. This phase would be more or less equivalent to the ongoing major projects.
- (d) Finally the projects would enter a consolidation phase, which would involve a continuation of more intensive development, further improvements to social infrastructure--especially education and health--and may also include the development of rural industries.

3. Good progress has meanwhile been made in preparing NRDP after its concept was first discussed during the 1973 agricultural sector review. For planning purposes the country has been divided into about 170 ecological planning areas (EPA). These EPA's are ecologically uniform with identifiable topographic boundaries and contain some 6,000-9,000 farm families each. They are suitable for extension management by one technical officer (TO) supervising ultimately about 12 technical assistants (TA), who in turn would each on average cover 500 farm families. Tentatively the EPA's have been grouped into a total of 47 development areas which are envisaged as the project areas of NRDP sub-projects. They include the areas of the ongoing major projects KRDP, LLDP, SVADP and CRLDP; Chitipa district is a separate development area and so are the N.W. Mzimba, Thiwi-Lifidzi and Kawinga areas. The 47 development areas in turn are tentatively grouped into ten development regions. It is envisaged that each of these regions will ultimately be managed and serviced by a regional management unit. The nucleus for seven such units exists already in the form of the three present Regional Agricultural Offices in Mzuzu, Lilongwe and Blantyre and the headquarters of the LLDP, SVADP, KRDP and CLRD projects, which all report directly to the Ministry. One of the Lilongwe units would need to be transferred, probably to Kasungu, and new regional management units would need to be established for the envisaged Mzimba, Shire West and Shire East development regions. So far no time table has been agreed upon for the establishment of the new regional management units but it is anticipated that the change-over from the existing organization to the new one would be gradual and involve some transitional arrangements.

4. The Government has prepared a first version of a bar chart which shows for each of the 47 development areas when NRDP activities would start and how development would be phased over the next 20 years. The following criteria were used to rank the 47 areas and to determine their priority for development:

- (a) areas with high, but largely undeveloped potential;
- (b) areas where considerable initiative is being shown by the farmers;
- (c) areas of food deficit;
- (d) areas of ready accessibility, and some existing infrastructure; and
- (e) maintaining an even balance in providing development assistance to all regions.

In the past, priorities have changed frequently for one reason or another. The Government is now aware that changes should be kept to the minimum and that no such changes should be made once the actual project preparation, i.e. surveys and detailed planning, has started. Changes in the actual commencement date of the sub-projects are inevitable, of course, since they depend on a number of factors, of which Malawi's manpower situation and the availability of development funds are the most important.

5. It is envisaged that NRDP would be implemented with financial assistance of World Bank/IDA and other external donors. An amount of MK 200,000 was included in the LLDP III Credit to assist the preparation of NRDP by providing for an expansion of MANR's land resources and agro-economic survey sections and for the establishment of crop trials. The funds were to cover NRDP preparation work during 1975/1976 and 1976/1977 but the program has recently been revised, mainly because of an agreed need to construct more staff houses than originally planned and because construction turned out to be more expensive than anticipated. The available funds now cover the year 1975/76 only. The present NRDP II Project proposes financing of a further two-year preliminary investment phase of NRDP and would cover the years 1976/77 and 1977/78. The Government intends to request Bank/IDA support for a full-fledged Phase I NRDP project, probably for four years from 1978/79 onwards.

6. The present NRDP preliminary investment phase involves further strengthening of a number of the Ministry's services which play key roles in the planning and future implementation of NRDP. This preliminary investment phase further includes financing for the start-up of NRDP in the development areas N.W. Mzimba (Northern Region), Thiwi-Lifidzi (Central Region) and Kawinga (Southern Region). Further details on each of the proposed investments are given below and in Annex 8.

Land Resources Surveys

7. Land resource surveys are made by the Ministry's land husbandry branch and involve an inventory of land and soil categories in the areas

to be developed, in particular the acreages suitable for crop growing, and recommended land use for suitable areas, together with recommendations for road lines and conservation practices. For NRDP these surveys would need to be done in approximately three development areas per year. Under the LLDP III project the land husbandry unit has already been expanded by a senior professional officer, a professional officer and a technical officer (draftsman) and this Project provides for the recruitment of an additional professional officer and two technical assistants, mainly for airphoto analysis. There are also provisions for housing of new staff, transport, airphotography and map production and other materials.

Agro-economic Surveys

8. The agro-economic survey unit in MANR is in charge of farm and socio-economic surveys in agricultural development areas in order to collect and analyze baseline data for project preparation and future evaluation. Depending on the nature of the project envisaged, the baseline data to be collected would include:

- (a) yields, production and disposal of major crops;
- (b) holding sizes and acreages of major crops;
- (c) types and values of purchased inputs;
- (d) details of the livestock population;
- (e) demographic data;
- (f) family income and expenditures;
- (g) when necessary, labor and sociological studies.

The agro-economic survey unit was established in the late 1960s mainly to conduct labour studies. With the passage of time the unit became increasingly involved in general survey work needed for project preparation. Because of this the unit has recently switched from the case study approach to the sample survey methodology which permits it to collect data from a wider sample of households living in dispersed areas. It has now been agreed with the Government that the usual two-year survey period would be cut back to one year, followed by a quick spot check on yields during the next harvesting season. Baseline data would thus be available at an earlier date and the risk of the unit studying an area which meanwhile has been dropped from Government's priority list--as frequently happened in the past--would be smaller. Under LLDP III the unit was expanded with two professional officers and two statistical clerks; under this Project the unit would be further strengthened with a senior technical officer, who would be responsible for field survey teams, one senior technical assistants for checking and verification of survey data and

training of new staff, and one senior statistical clerk to assist the existing data processing officer in supervising the data processing unit. Housing for new staff, survey and office equipment, and transport would also be provided for.

Crop Experiments

9. It is clear that any crop input package should have the backing of experimental data which are relevant for the area where the package is to be recommended. In many areas these data are still lacking and it is therefore important that at an early stage plots be laid out to test input packages and other factors which effect the levels of production. These tests would initially be restricted to the crops which are commonly grown in the area and could at a later stage also include crops which appear promising. Replicates of test sites will depend on soil types and micro-ecological conditions in the development area. Under provisions of the LLDP III Credit test sites are being established in two development areas and under this Project activities would be started in six areas which are scheduled to be included in the NRDP I project, due to start in 1978/79. The areas, staff and crops involved are:

<u>Area</u>	<u>Region</u>	<u>Grade of Staff Responsible</u>	<u>Crops</u>
Henga Valley	North	TA	maize, groundnuts, beans, cotton
Gowa	Central	TA	maize, groundnuts, possibly cotton
Mwanza	South	STA	cotton, maize, groundnuts, possibly citrus
Chonde	Central	TA	maize, groundnuts
Ntchisi	Central	TA	maize, groundnuts, possibly rice
S.W. Mzimba	North	TA	oriental tobacco, maize, groundnuts, beans, livestock

The Project would also provide for staff housing, tools and materials, transport, and general labour.

Evaluation Units

10. Each of the four ongoing major projects has an evaluation unit to monitor and analyze the projects' progress. In part the units collect relevant data from other sections of the projects, for example cost accounting data, inputs issued to the farmers, miles of roads constructed, etc. Other

data are collected through field surveys, for example on crop yields and production, crop acreages and holding sizes, values of purchased inputs, sales of major crops, etc. The various evaluation units have so far not been very successful in producing reliable and meaningful results. On several occasions too much emphasis has been placed on data collection rather than analysis and year-to-year figures are often not comparable because of changes in methodology. This is partly due to the fact that evaluation is a rather recent feature; clear guidance as to what the units are supposed to do has been lacking and frequent staff changes have sometimes caused a lack of continuity. The Government has recognized the need for firmer guidance of evaluation work and a working party consisting of representatives of the Ministry, the various evaluation sections and the agro-economic survey unit, has now made good progress to a better definition of the tasks of the various sections. It is recognized that the survey results obtained by the different organizations should be comparable and that the survey terms, definitions and sampling procedures must be similar. An evaluation section has already been established within MANR's planning unit and the soon-to-be nominated head of this section will be responsible for the coordination of all project evaluation work within the Ministry. The section would review annual work programs of the projects' evaluation units and might also involve itself in further analysis of data collected by the evaluation units and by the agro-economic survey section.

11. The Government requested funds for the establishment and operation of three new evaluation units to be attached to the existing Regional Agricultural Offices at Mzuzu, Lilongwe and Blantyre and the ultimate objective was to attach eventually evaluation units to each of the future ten regional management units. In view of the large amount of resources involved in such an arrangement, both in manpower and finance, it was agreed to include provision for only one additional evaluation unit, to be established in the Regional Agricultural Office in Mzuzu. The unit would specifically be charged with monitoring the progress in the N.W. Mzimba development area. The Thiwi-Lifidzi development area would be monitored by the LLDP evaluation unit, which would not be too difficult since the area is located on LLDP's south-eastern border. The future organization of evaluation work should be further discussed and agreed upon during the appraisal of the NRDP I project. It is conceivable that ultimately three evaluation units, established in Mzuzu, Lilongwe and Blantyre, with some field staff in the development areas would be an appropriate solution. This would involve mergers of the existing KRDP evaluation unit with the new one to be established in Mzuzu for the Northern Region, and of the LLDP and CRLDP evaluation units for the Central Region. The SVADP evaluation unit could then become responsible for the whole Southern Region and could be based in Blantyre. The new Mzuzu evaluation unit would under this Project be staffed with one agricultural economist (PO), one technical officer (TO), two technical assistants (TA) for the two field teams and one TA for data processing, and six development assistants (DA) for the two field teams (three for each team) and three DA's for data processing. Housing, transport, and field and office equipment would be provided for, as well.

Accounts and Credit

12. In contrast with the ongoing major projects general and credit accounts of NRDP preinvestment phase would be kept at the Ministry rather than in the projects' headquarters. MANR's accounts division controls at present the accounts of all departments, except the major projects, and it does not have the capacity to handle the additional volume of work involved. Therefore a nucleus staff would be set up under the preliminary investment phase of NRDP for the temporary central control of both credit finance and development finance. Accounts and records to be handled by the nucleus staff would be maintained on a fully commercial basis using the systems already in operation in the major, IDA-financed, projects. This Project would provide for the following staff to be based permanently at MANR's headquarters at Lilongwe: one chief accountant, one senior accountant, one accountant and one accounts assistant for the development accounts section and one field officer credit, one accountant and one senior accounts assistant for the credit section. In addition the following staff would for training purposes temporarily be stationed in Lilongwe and in due course be transferred to the development area headquarters (N.W. Mzimba, Thiwi-Lifidzi and Kawinga sub-projects): three accountants and three accounts assistants for the development accounts section and three accounts assistants for the credit section. New recruits would replace staff being transferred to the area headquarters; the MANR headquarters unit would thus serve as the training ground for the accountants and their assistants required for NRDP. This Project would also provide for continued financing of a financial controller--presently a staff member of ADS, assigned to the IDA-financed projects--for the setting up of a national credit system. The Project would also retain the services of a systems analyst/programmer to computerize credit accounts, possibly to be recruited also through ADS. The Project would further provide housing for new staff, transport, and office equipment and operating costs.

Road Construction

13. Each of the three ongoing IDA-financed projects has its own construction unit, including heavy plant for road construction. A certain amount of road construction will be needed in the areas to be developed under NRDP although the volume of work would be less during the initial stages of development than in the major projects. Normally the Ministry of Works and Supplies (MOW) would be called upon to carry out the road construction work through hiring plant from its Public Vehicle Hire Organization (PVHO), however the Ministry has heavy road construction and maintenance commitments and limited plant availability. Therefore, and also to ensure timely and well-coordinated execution of the works, MANR would set up a small road construction unit. Full use would be made from the experience gained under the major projects. The construction and conservation officer, provided by ADS for LLDP III and who is completing his present assignment in the course of 1976, would be retained under this Project for the NRDP construction program. A bulldozer a grader, a front end loader, four lorries, and some other equipment would be procured.

Coffee Study and Other Consultancies

14. A provision has been included in the Project for a study of the prospects for development of Malawi's smallholder coffee industry. The study would be carried out by a coffee agronomist and an economist (see also Annex 1). The need for other consultant services may arise during the implementation of the Project and allowance for this has been made in the cost estimates. Specific subjects on which further outside help may be needed include:

- (a) a review of proposals for a national credit program;
- (b) interpretation in economic terms of research data from NRDP trials and assistance in the formulation of input packages and farming systems;
- (c) setting up of a well organized library system at the main agricultural research station at Chitedze.

NRDP Sub-projects

15. Under this Project preliminary investments would be made in three development areas. The names of these NRDP sub-projects and some details are summarized below:

	<u>N.W. Mzimba</u>	<u>Thiwi-Lifidzi</u>	<u>Kawinga</u>
Region	North	Central	South
Number of EPA's	2.5	4	5
Number of Families	10,250	25,500	20,240
Gross Area, acres	437,000	244,530	474,000
Population Density, persons/sq mile	75	340	140
Crops	maize groundnuts beans sweet potatoes millet sorghum cassava oriental tobacco	maize groundnuts beans dark-fired tobacco Irish Potatoes	maize groundnuts beans cassava sweet potatoes cotton rice millet sorghum

The Mzimba area is sparsely settled and some good soils are not used for crop cultivation mainly due to poor water supplies. The soils are generally erodible and require good management and conservation measures; with the help of the Mzuzu-based land husbandry section planning of farms on a catchment basis has been started by marking water-ways and aligning ridges on the contour. A small proportion of farmers have organized themselves in groups and they receive a great deal of attention from the extension staff. The use of fertilizers and seeds, supplied on credit to group members, is increasing but total quantities involved are still small. Thiwi-Lifidzi is very densely populated and all arable land is effectively under cultivation. Farmers use contour cultivation and dry season cultivation more than in any other region of Malawi. The use of fertilizers, mainly on maize, has increased substantially over the last few years and reached about 1,200 m ton in 1973/74; many farmers clubs were formed with the main objective of buying fertilizer bulk at a discount from ADMARC. The Kawinga development area consists of two distinct parts, namely a cattle, rice, cassava economy bordering Lake Chilwa in the south and a maize, groundnut, cotton, tobacco economy on the higher plateau areas in the north. In the Lake Chilwa plains drainage is impeded during the wet season but there is a large amount of readily available residual soil moisture during most of the dry season. The flats have a clear potential for increased rice and livestock production. The northern part has sandy soils and a rather low rainfall of only 30 inches per year. There is a noticeable interest in tobacco growing.

16. All three development areas have a good potential for increased production, mainly through more intensified cultivation methods and in some parts also through opening up of presently unused land (Mzimba, southern Kawinga). In all areas there has been a favorable response by the farmers towards pilot development activities--especially in Mzimba and Thiwi-Lifidzi. Work remains to be done, however, on the preparation of suitable crop and livestock development plans for the various areas. The agro-economic survey unit has started in 1975 a systematic survey in the Thiwi-Lifidzi area and will have to go back to Mzimba and Kawinga where the unit made case studies of several villages a few years ago. A thorough land resources survey was done in 1975 in the Kawinga area but a more detailed inventory remains to be made of the Mzimba and Thiwi-Lifidzi areas. A great deal of agricultural research results may be of immediate use but farm scale testing is required to firm up the recommendations. There are ample indications that investments of the nature as described under the preparatory phase of NRDP (see paragraph 2) are justified in all three cases. In Mzimba and Thiwi-Lifidzi NRDP activities would start during the first year of the two-year preliminary investment phase (1976/77) and in Kawinga in the second year (1977/78).

17. In Mzimba a total of 19 houses would be built for new staff during the first year, as well as a rural training center and office accommodation. The construction of 20 boreholes would be spread over the two years and the construction of two essential bridges would be done in the second year.

ADMARC would build two bush markets/input stores during the two-year period and some additional health facilities would also be constructed during that period. A senior technical officer, who would act as the Project supervisor under the divisional agricultural officer at Mzimba-town, would be recruited during the first year and new extension, credit and land husbandry staff during the second year. Present and future staff positions are as follows:

	<u>At present</u>	<u>Additional</u>	<u>End of year 2</u>
Project supervisor (STO)	-	1	1
TO Extension	1	1	2
TA Extension	11	7	18
TO Credit	-	1	1
TA Credit	-	2	2
TO Land husbandry	-	1	1
TA Land husbandry	-	4	4
TO Research	-	1	1
TA Research	-	1	1
DA Extension	<u>5</u>	<u>(-5)</u>	<u>-</u>
Total	17	14	31

The first seasonal and medium-term credit disbursements would be made during the second year when the Project would assume responsibility for credit operations, which are at present under the Government Loans Board. The new land husbandry staff would ultimately be integrated with the extension staff when the main task of preparing proper layouts for the farms would approach its final stage.

18. Preliminary investments in the Thiwi-Lifidzi sub-project would follow the same pattern as in Mzimba and the first year's activities would mainly concern the construction of some 33 additional staff houses, two rural training centers, office accommodation and stores. Some 15 boreholes would also be constructed in the first year. Provision has been made for the construction or improvement of some 50 miles of rural roads (some improvements are necessary in Mzimba as well but for logistic reasons it is unlikely that this can be done in the second year). ADMARC would construct three input stores over the two-year period. As in Mzimba a Project supervisor would be recruited in the first year and other additional staff in the second year. Present and future staff positions are as follows:

	<u>At present</u>	<u>Additional</u>	<u>End of year 2</u>
Project supervisor (STO)	-	1	1
TO Extension	1	2	3
TA Extension	10	14	24
TO Land husbandry	-	1	1
TA Land husbandry	-	2	2
TO Credit	-	1	1
TA Credit	-	4	4
TO Tobacco	-	1	1
DA Extension	4	(-4)	-
TA Research	-	1	1
TA Forestry	-	1	1
TA Farm House Instructresses	-	2	2
Total	15	26	41

Reafforestation would be essential in this area because of the rapidly diminishing wood reserves. Seasonal credit, which so far has not been available, has to be introduced very carefully because of the adverse impact this may have on cash sales of fertilizers; credit operations would therefore at first most likely concentrate on medium term items. Only a small amount for credit operations has been provided for in the second year.

19. Investments in the Kawinga sub-project would start in the second Project year and mainly consist of the construction of two rural training centers and 28 houses for staff to be recruited in the third year (probably year 1 of NRDP I). A Project supervisor (CTO) would be recruited in the second year. The Project also provides for a technical officer research. Two rural training centers, office accommodation and ten boreholes would also be constructed and ADMARC would build one market and two input stores.

20. All additional staff positions to be established under the NRDP pre-investment phase are summarized in Appendix 1.

February 15, 1976

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Additional Positions to be Established for NRDP Pre-investment Phase

A. Central Services MANR

(i) Land Husbandry Section (Lilongwe)

- 1 Professional Officer
- 2 Technical Assistants

(ii) Agro-economic Survey Section (Lilongwe)

- 1 Senior Technical Officer
- 1 Senior Technical Assistant
- 1 Senior Statistical Clerk

(iii) Crop Experiments (various field locations)

- 1 Senior Technical Assistant
- 5 Technical Assistants (of which 3 in year 2 only)

(iv) Evaluation Unit (Mzuzu)

- 1 Professional Officer
- 1 Technical Officer
- 3 Technical Assistants
- 9 Development Assistants
- 1 Typist

(v) Accounts Road Construction and Consultancies (Lilongwe)

- 1 Systems Analyst/Programmer
- 1 Construction Officer
- 1 Chief Accountant
- 1 Senior Accountant
- 5 Accountants
- 1 Senior Accounts Assistant
- 6 Accounts Assistants
- 1 Field Officer (TO) - Credit

B. N.W. Mzimba Sub-project

Year 1:

- 1 Senior Technical Officer - Project Supervisor

Year 2:

- 1 Technical Officer - Extension and Training
- 1 Technical Officer - Credit
- 1 Technical Officer - Land Husbandry
- 1 Technical Officer - Research
- 7 Technical Assistants - Extension and Training
- 2 Technical Assistants - Credit
- 4 Technical Assistants - Land Husbandry
- 1 Technical Assistant - Research

C. Thiwi-Lifidzi Sub-project

Year 1:

- 1 Senior Technical Officer - Project Supervisor
- 1 Clerical Officer

Year 2:

- 2 Technical Officers - Extension and Training
- 1 Technical Officer - Credit
- 1 Technical Officer - Land Husbandry
- 1 Technical Officer - Tobacco Specialist
- 20 Technical Assistants - Extension and Training
- 1 Technical Assistant - Research
- 2 Technical Assistant - Farm Home Instructresses
- 1 Technical Assistant - Forest Ranger
- 1 Typist

D. Kawinga Sub-project

Year 2:

- 1 Chief Technical Officer - Project Supervisor
- 1 Technical Officer - Research

February 17, 1976

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

(Summary of Project Costs
(MK '000)

	Reference	Year 1 (1976/77)	Year 2 (1977/78)	Year 3 (1978/79)	Year 4 (1980/81)	Total	Foreign Exchange %	Foreign Exchange Total
<u>Karonga Rural Development Project</u>								
Extension	Annex 8, Table 2	200.5	222.3	190.4	105.5	718.7	42	304.7
Land husbandry	Annex 8, Table 3	54.4	42.0	39.5	7.0	142.9	37	53.1
Livestock	Annex 8, Table 4	68.0	90.6	63.2	40.4	262.2	40	104.4
Construction Unit	Annex 8, Table 5	291.5	271.4	130.6	42.9	736.4	50	371.2
Research	Annex 8, Table 6	62.6	59.5	50.3	35.6	208.0	43	88.6
Hydrology	Annex 8, Table 7	41.6	44.7	28.8	20.9	136.0	53	72.0
Mechanical Maintenance	Annex 8, Table 8	74.5	44.9	34.6	15.3	169.3	72	121.2
Finance (Accounting Services)	Annex 8, Table 9	189.9	186.2	148.3	100.8	625.2	45	280.2
On-Farm Credit	Annex 3, Table 1	42.9	50.6	48.7	31.2	173.4	85	147.4
Evaluation	Annex 8, Table 10	55.8	45.7	48.5	30.6	180.6	45	81.0
Management Unit	Annex 8, Table 11	73.3	68.8	55.7	56.5	254.3	42	106.2
ADMARC	Annex 8, Table 12	158.0	158.0	150.0	-	466.0	30	139.8
Health	Annex 8, Table 13	144.0	160.4	47.3	47.3	399.0	41	165.5
Sub-total		1,457.0	1,445.1	1,035.9	534.0	4,472.0	45	2,035.3
<u>NRDP Pre-investment Phase</u>	Annex 8, Table 1 a	1,012.1	1,264.3	-	-	2,276.4	52	1,190.6
<u>Lake Transportation</u>	Annex 13	429.0	1,107.0	-	-	1,536.0	72	1,104.0
Base Cost		2,898.1	3,816.4	1,035.9	534.0	8,284.4	52	4,329.9
Contingencies - physical 1/		174.5	256.6	65.3	43.1	539.5	52	280.5
- price 2/		362.2	937.1	425.4	334.4	2,059.1	52	1,070.7
Project Cost		3,434.8	5,010.1	1,526.6	911.5	10,883.0	52	5,681.1

- 1/ 10% for Lake Transportation and 5% on all other items. Contingencies on the credit component are based on total input requirements.
 2/ Civil Works and Lake Transportation component 13% in Year 1 and 12% in Year 2 - 4, other items 9% in Year 1 and 8% in Years 2 - 4.
 Contingencies on the credit component are based on total input requirements.

March 2, 1976

MALAWI
KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

NRDP - Pre-investment Phase

Summary
(MK)

	<u>Reference</u>		<u>Year 1</u> <u>(1976/77)</u>	<u>Year 2</u> <u>(1977/78)</u>	<u>Total</u>	<u>F. Exch.</u> <u>%</u>	<u>F. Exch.</u> <u>Total</u>
1. Central Services							
(a) Land resources survey	Annex 8, Table 14		83,750	58,640	142,390	56	80,322
(b) Agro economic survey	" 15		65,100	36,686	101,786	44	44,681
(c) Crop experiments	" 16		29,771	30,848	60,619	44	26,583
(d) Evaluation Unit - Mzuzu	" 17		75,962	19,996	95,958	38	36,277
(e) Accounts, road construction and consultancies	" 18		<u>299,770</u>	<u>487,661</u>	<u>787,431</u>	<u>74</u>	<u>585,076</u>
Subtotal (1)			554,353	633,831	1,188,184	64	772,939
2. Mzimba Sub-project	" 19		162,640	229,694	392,334	44	171,220
3. Thiwi/Lifidzi Sub-project	" 20		222,040	140,997	363,037	37	134,532
4. Kawinga Sub-project	" 21	--	--	197,160	197,160	35	69,824
5. Markets and Input Stores (ADMARC)	" 22		30,000	60,000	90,000	30	27,000
6. Health	" 23		43,080	2,623	45,703	33	15,039
Total			<u>1,012,113</u>	<u>1,264,305</u>	<u>2,276,418</u>	<u>52</u>	<u>1,190,554</u>

ANNEX 8
Table 1a

March 2, 1976

MALAWI
KARONGA RURAL DEVELOPMENT PROGRAM - PHASE II

ANNEX 8
Table 2

		<u>Extension</u> (MK)							
	<u>Unit</u> <u>Cost</u>	<u>Grade</u>	<u>Year 1</u> <u>(1976/77)</u>	<u>Year 2</u> <u>(1977/78)</u>	<u>Year 3</u> <u>(1978/79)</u>	<u>Year 4</u> <u>(1979/80)</u>	<u>Total</u>	<u>F. Exch.</u> <u>1</u>	<u>F. Exch.</u> <u>Total</u>
A. CAPITAL COSTS									
(a) Karonga:									
4-wheel drive LWB pick-up	6,670		6,670	6,670	--	--	13,340	90	12,006
4-wheel drive SWB 7 seater	6,830		6,830	6,830	--	--	13,660	90	12,294
Extension aids van	8,910		--	--	8,910	--	8,910	90	8,019
Motor cycle	600		(4) 2,400	(5) 3,000	--	--	5,400	90	4,860
Personnel carrier	12,000		--	12,000	--	--	12,000	90	10,800
Extension aids equipment			<u>1,100</u>	<u>1,100</u>	<u>300</u>	<u>--</u>	<u>2,500</u>	<u>75</u>	<u>1,875</u>
Subtotal (a)			17,000	29,600	9,210	--	55,810	89	49,854
(b) Chitipa:									
Personnel carrier	12,000		12,000	--	--	--	12,000	90	10,800
4-wheel drive LWB pick-up	6,670		6,670	--	--	--	6,670	90	6,003
Extension aids van	8,910		--	8,910	--	--	8,910	90	8,019
Motor cycle	600		(4) 2,400	(4) 2,400	(2) 1,200	--	6,000	90	5,400
Extension aids equipment			1,600	2,100	1,300	1,000	6,000	75	4,500
Equipment for training center			1,100	1,100	550	--	2,750	75	2,063
Office furniture and equipment			<u>1,650</u>	<u>1,650</u>	<u>1,650</u>	<u>--</u>	<u>4,950</u>	<u>50</u>	<u>2,475</u>
Subtotal (b)			25,420	16,160	4,700	1,000	47,280	83	39,260
Total A (a,b)			<u>42,420</u>	<u>45,760</u>	<u>13,910</u>	<u>1,000</u>	<u>103,090</u>	<u>86</u>	<u>89,114</u>
B. OPERATING COSTS									
(a) Salaries and wages									
(i) Karonga:									
Senior Settlement and Extension Officer	4,050	S9	4,050	4,050	4,050	4,050	16,200	--	--
Principal Field Officer	3,300	CTD	3,300	3,300	3,300	3,300	13,200	--	--
Senior Field Officer	2,500	STO	(2) 5,000	(2) 5,000	(2) 5,000	(2) 5,000	20,000	--	--
Field Officer	1,500	TO	(6) 9,000	(6) 9,000	(6) 9,000	(6) 9,000	36,000	--	--
Senior Field Assistant	1,300	STA	(5) 6,500	(5) 6,500	(5) 6,500	(5) 6,500	26,000	--	--
Field Assistant	600	TA	(13) 7,800	(16) 9,600	(19) 11,400	(22) 13,200	42,000	--	--
Farm Home Instructress	600	TA	(3) 1,800	(3) 1,800	(3) 1,800	(3) 1,800	7,200	--	--
Development Assistant	360	DA	(10) 3,600	(14) 5,040	(17) 6,120	(20) 7,200	21,960	--	--
Clerical Officer	400	CO	(2) 800	(2) 800	(2) 800	(2) 800	3,200	--	--
Labourer	80		(6) 480	(8) 640	(8) 640	(8) 640	2,400	--	--
Driver	700		700	700	700	700	2,800	--	--
Subtotal (i)			43,030	46,430	49,310	52,190	190,960	--	--
(ii) Chitipa:									
Principal Field Officer	3,300	CTO	3,300	3,300	3,300	3,300	13,200	--	--
Field Officer	1,500	TO	(2) 3,000	(4) 6,000	(5) 7,500	(5) 7,500	24,000	--	--
Senior Field Assistant	1,300	STA	(2) 2,600	(3) 3,900	(3) 3,900	(3) 3,900	14,300	--	--
Field Assistant	600	TA	(5) 3,000	(9) 5,400	(11) 6,600	(12) 7,200	22,200	--	--
Farm Home Instructress	600	TA	600	600	600	600	2,400	--	--
Development Assistant	360	DA	(4) 1,440	(4) 1,440	(4) 1,440	(4) 1,440	5,760	--	--
Senior Clerical Officer	1,300	SCO	1,300	1,300	1,300	1,300	5,200	--	--
Labourer	80		(6) 480	(8) 640	(10) 800	(10) 800	2,720	--	--
Driver	700		700	700	700	700	2,800	--	--
Subtotal (ii)			16,420	23,280	26,140	26,740	92,580	--	--
Total (a)			59,450	69,710	75,450	78,930	283,540	--	--
(b) Other Operating Costs:									
(i) Karonga:									
4-wheel drive LWB pick-up 15,000 m/yr @ 20¢	3,000		(2) 6,000	(2) 6,000	(2) 6,000	(2) 6,000	24,000	90	21,600
4-wheel drive SWB 7 seater 15,000 m/yr @ 18¢	2,700		(2) 5,400	(2) 5,400	(2) 5,400	(2) 5,400	21,600	90	19,440
Extension aids van 15,000 m/yr @ 22¢	3,300		3,300	3,300	3,300	3,300	13,200	90	11,880
Motor cycle 9,000 m/yr @ 4¢	360		(12) 4,320	(12) 4,320	(12) 4,320	(12) 4,320	17,280	90	15,552
Personnel carrier 12,000 m/yr @ 28¢	3,360		3,360	3,360	3,360	3,360	13,440	90	12,096
Bicycle allowance	21		(20) 420	(20) 420	(20) 420	(20) 420	1,680	--	--
Miscellaneous			<u>1,100</u>	<u>1,100</u>	<u>1,100</u>	<u>1,100</u>	<u>4,400</u>	<u>75</u>	<u>3,300</u>
Subtotal (i)			23,900	23,900	23,900	23,900	95,600	87	83,868
(ii) Chitipa:									
Personnel carrier 18,000 m/yr @ 28¢	5,040		5,040	5,040	5,040	5,040	20,160	90	18,144
4-wheel drive LWB pick-up 18,000 m/yr @ 20¢	3,600		3,600	3,600	3,600	3,600	14,400	90	12,960
Extension aids van 18,000 m/yr @ 22¢	3,960		--	3,960	3,960	3,960	11,880	90	10,692
Motor cycle 9,000 m/yr @ 4¢	360		(4) 1,440	(6) 2,160	(7) 2,520	(8) 2,880	9,000	90	8,100
Motor cycle 12,000 m/yr @ 4¢	480		480	(3) 1,440	(4) 1,920	(4) 1,920	5,760	90	5,184
Bicycle allowance	21		(4) 84	(4) 84	(4) 84	(4) 84	336	--	--
Lorry 5-ton 10,000 m/yr @ 34¢	3,400		3,400	3,400	3,400	3,400	13,600	90	12,240
Miscellaneous			550	550	550	550	2,200	75	1,650
Building maintenance 2 1/2% p.a.			--	<u>1,496</u>	<u>3,201</u>	<u>4,907</u>	<u>9,604</u>	<u>30</u>	<u>2,881</u>
Subtotal (ii)			14,594	21,730	24,275	26,341	86,940	83	71,851
Total (b)			38,494	45,630	48,175	50,241	182,540	85	155,719
Total B (a,b)			<u>97,944</u>	<u>115,340</u>	<u>123,625</u>	<u>129,171</u>	<u>466,080</u>	<u>33</u>	<u>155,719</u>
C. CIVIL WORKS									
Staff Houses (Appendix 3)	--		44,222	44,222	44,222	3,200	135,866	30	40,760
Training Center - Day Training	12/sq.ft.		9,600	--	--	--	9,600	30	2,880
Training Center - Residential	12/sq.ft.		--	18,000	18,000	--	36,000	30	10,800
Offices	3,000		(2) 6,000	(2) 6,000	(2) 6,000	--	18,000	30	5,400
Traditional house	50		(6) 300	--	--	--	300	--	--
Total C			<u>60,122</u>	<u>68,222</u>	<u>68,222</u>	<u>3,200</u>	<u>199,766</u>	<u>30</u>	<u>59,840</u>
Grand Total (A,B,C)			200,486	229,322	205,757	133,371	768,936	40	304,673
Less Recurrent Costs (Annex 8, Appendix 1)			--	7,000	15,360	27,900	50,260	--	--
Grand Total			<u>200,486</u>	<u>222,322</u>	<u>190,397</u>	<u>105,471</u>	<u>718,676</u>	<u>42</u>	<u>304,673</u>

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MALAWI
KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

		<u>Land Husbandry</u> (MK)							
	<u>Unit</u> <u>Cost</u>	<u>Grade</u>	<u>Year 1</u> <u>(1976/77)</u>	<u>Year 2</u> <u>(1977/78)</u>	<u>Year 3</u> <u>(1978/79)</u>	<u>Year 4</u> <u>(1979/80)</u>	<u>Total</u>	<u>Foreign</u> <u>Exchange</u>	<u>Foreign Exchange</u> <u>Total</u>
A. CAPITAL COSTS									
4-wheel drive LWB pick-up	6,670		6,670	-	-	-	6,670	90	6,003
Motor Cycle	600	(2)	1,200	-	-	-	1,200	90	1,080
Tentage			1,000	-	-	-	1,000	90	900
Survey Equipment	400	(8)	3,200	-	-	-	3,200	90	2,880
TOTAL A			12,070	-	-	-	12,070	90	10,863
B. OPERATING COSTS									
(a) Salaries and Wages									
Land Husbandry Officer	5,700	PO	5,700	5,700	5,700	-	17,100	50	8,550
Field Officer	1,500	TO (2)	3,000	(2) 3,000	(2) 3,000	(2) 3,000	12,000	-	-
Senior Field Assistant	1,300	STA	1,300	1,300	1,300	-	3,900	-	-
Field Assistant	600	TA (8)	4,800	(8) 4,800	(4) 2,400	-	12,000	-	-
Labourer	80	(16)	1,280	(16) 1,280	(8) 640	-	3,200	-	-
Driver	700		700	700	700	-	2,100	-	-
Sub total (a)			16,780	16,780	13,740	3,000	50,300	17	8,550
(b) Other operating costs									
4-wheel drive LWB pick-up 15,000 m/yr at 20¢	3,000		3,000	3,000	3,000	3,000	12,000	90	10,800
Motor Cycle 7,500 m/yr at 4¢	300	(3)	900	(3) 900	(3) 900	(3) 900	3,600	90	3,240
Building Maintenance 2 1/2¢ p.a.			--	520	1,041	1,561	3,122	30	937
Sub total (b)			3,900	4,420	4,941	5,461	18,722	80	14,977
TOTAL B			20,680	21,200	18,681	8,461	69,022	34	23,527
C. CIVIL WORKS									
Staff Houses (Appendix 3)			20,810	20,810	20,810	-	62,430	30	18,729
Traditional House	50	(16)	800	-	-	-	800	-	-
TOTAL C			21,610	20,810	20,810	-	63,230	30	18,729
GRAND TOTAL (A, B & C)			54,360	42,010	39,491	8,461	144,322	37	53,119
Less recurrent costs (Annex 8, Appendix 1)			-	-	-	1,500	1,500	-	-
			54,360	42,010	39,491	6,961	142,822	37	53,119

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KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

	Unit Cost	Grade	Year 1 (1976/77)	Livestock (MK) Year 2 (1977/78)	Year 3 (1978/79)	Year 4 (1979/80)	Total	Foreign Exchange %	Foreign Exchange Total
A. CAPITAL COSTS									
4-wheel drive LWB pick-up	6.670		-	6.670	-	-	6.670	90	6.003
4-wheel SWB 7 seater	6.830		-	6.830	-	-	6.830	90	6.147
Pumps and hoses			1.000	2.000	1.000	-	4.000	90	3.600
Refrigerator	600		600	600	-	-	1.200	90	1.080
Office furniture & equip- ment			-	600	-	-	600	50	300
Veterinary equipment			600	-	-	-	600	90	540
Ploughs & chains, etc.			500	400	400	100	1.400	50	700
TOTAL A			2.700	17.100	1.400	100	21.300	86	18.370
B. OPERATING COSTS									
(a) Salaries and Wages:									
Senior Animal Husbandry Officer	6.080	S9	6.080	6.080	6.080	6.080	24.320	50	12.160
Field Officer	1.500	TO	(2) 3.000	(2) 3.000	(2) 3.000	(2) 3.000	12.000	-	-
Veterinary Assistant	600	TA	(8) 4.800	(8) 4.800	(8) 4.800	(8) 4.800	19.200	-	-
Field Assistant	600	TA	(3) 1.800	(3) 1.800	(3) 1.800	(3) 1.800	7.200	-	-
Clerical Officer	600	CO	600	600	600	600	2.400	-	-
Development Assistant	360	DA	(4) 1.440	(4) 1.440	(4) 1.440	(4) 1.440	5.760	-	-
Labourer	80		(5) 4.080	(5) 4.080	(5) 4.080	(5) 4.080	16.320	-	-
Driver	700		700	700	700	700	2.800	-	-
Subtotal (a)			22.500	22.500	22.500	22,500	90.000	14	12.160
(b) Other operating costs:									
4-wheel drive - pick up									
18.000 m/yr at 20t	3.600		3.600	3.600	3.600	3.600	14.400	90	12.960
" " drive 7 seater -									
18.000 m/yr at 18t	3.240		3.240	3.240	3.240	3.240	12.960	90	11.664
Water supplies and pumps			2.200	1.100	1.100	1.100	5.500	50	2.750
Dipping fluid	120	(22)	2.640	(23) 2.760	(24) 2.880	(24) 2.880	11.160	50	5.580
Drugs and vaccines			3.000	3.000	3.000	3.000	12.000	90	10.800
Seeds and fertilizer			500	500	200	100	1.300	90	1.170
Bicycle allowance	21	(4)	84	(4) 84	(4) 84	(4) 84	336	-	-
Miscellaneous			1.000	1.000	600	400	3.000	50	1.500
Borehole maintenance	40		-	(2) 80	(5) 200	(8) 320	600	30	180
Lufita Agriculture Center 1/ Chisi Hill Grazing Scheme 2/			4.457	6.267	6.267	6.267	23.258	29	6.781
			911	911	911	911	3.644	-	-
Karonga Livestock Center 3/			2.950	2.950	2.950	2.950	11.800	32	3.816
Building Maintenance 2 1/2 nd p.a.			-	327	798	1.032	2.157	30	647
Subtotal (b)			24.587	25.819	25.829	25.884	102.115	57	57.846
TOTAL B			47.082	48.319	48.329	48.384	192.115	36	70.006
C. CIVIL WORKS									
Staff Houses (Appendix 3)			7.562	7.562	7.562	-	22.686	30	6.806
Traditional house	50	(4)	200	-	-	-	200	-	-
Offices			-	4.000	-	-	4.000	30	1.200
Stores			-	1.800	1.800	-	3.600	30	1.080
Diptank	5.500		5.500	5.500	-	-	11.000	30	3.300
Borehole	2.500	(2)	5.000	(3) 7.500	(3) 7.500	-	20.000	30	6.000
TOTAL C			18.262	26.362	16.862	-	61.486	30	18.386
GRAND TOTAL (A B & C)			68.039	91.776	66.587	48.479	274.881	39	106.762
Less recurrent costs (Annex 8, Appendix 1)									
			-	1.200	3.395	8.050	12.645	18	2.357
			68.039	90.576	63.192	40.429	262.236	49	104.405

Table 4

1/ Details in Table 4 (a)

2/ Details in Table 4 (b)

3/ Details in Table 4 (c)

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ANNEX 8
Table 4

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Lufita Agricultural Center
(MK)

a)	<u>Personal Emoluments</u>	<u>Grade</u>	<u>Unit Cost</u>	<u>Year 1</u> <u>(1976/77)</u>	<u>Year 2</u> <u>(1977/78)</u>	<u>Year 3</u> <u>(1978/79)</u>	<u>Year 4</u> <u>(1979/80)</u>	<u>Total</u>	<u>Foreign Exchange</u> <u>%</u>	<u>Foreign Exchange</u> <u>Total</u>
	Technical Officer	TO	1,500	-	-	-	-	-	-	-
	Technical Assistant	TA	600	-	-	-	-	-	-	-
	Veterinary Assistant	TA		600	600	600	600	2,400	-	-
	Messenger			170	170	170	170	680	-	-
	Labourer		80	(10) 800	(10) 800	(10) 800	(10) 800	3,200	-	-
	Sub-total a)			1,570	1,570	1,570	1,570	6,280	-	-
b)	<u>Operating Costs</u>									
	Bicycle allowance		21	(2) 42	(2) 42	(2) 42	(2) 42	168	-	-
	Fuels and implements			100	100	100	100	400	90	360
	Fertilizer & seeds			850	850	850	850	3,400	75	2,550
	Fencing maintenance	10% p.a.			250	250	250	750	30	225
	Building maintenance	2 1/2% p.a.			1,460	1,460	1,460	4,380	30	1,314
	Roads maintenance	3% p.a.		150	150	150	150	600	30	180
	Water supplies			1,380	1,380	1,380	1,380	5,520	30	1,656
	Supplementary feed @ MK5 per head of cattle	(53)	265	(73) 365	(73) 365	(73) 365	(73) 365	1,360	10	136
	Dipping drugs, disinfectants			100	100	100	100	400	90	360
	Sub-total b)			2,887	4,697	4,697	4,697	16,978	40	6,781
	Total (a+b) ^{1/}			<u>4,457</u>	<u>6,267</u>	<u>6,267</u>	<u>6,267</u>	<u>23,258</u>	<u>29</u>	<u>6,781</u>

^{1/} Included in Table 4.

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MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Chisi Hill Grazing Scheme

(MK)

	<u>Year 1</u> <u>(1976/77)</u>	<u>Year 2</u> <u>(1977/78)</u>	<u>Year 3</u> <u>(1978/79)</u>	<u>Year 4</u> <u>(1979/80)</u>	<u>Total</u>	<u>Foreign Exchange</u> <u>%</u>	<u>Foreign Exchange</u> <u>Total</u>
Maintenance of paddocks	400	400	400	400	1,600	-	-
Maintenance of herdmen's hut	30	30	30	30	120	-	-
Development Assistant	360	360	360	360	1,440	-	-
Bicycle allowance	21	21	21	21	84	-	-
Pasture Improvement	<u>100</u>	<u>100</u>	<u>100</u>	<u>100</u>	<u>400</u>	<u>-</u>	<u>-</u>
Total ^{1/}	<u>911</u>	<u>911</u>	<u>911</u>	<u>911</u>	<u>3,644</u>	<u>-</u>	<u>-</u>

^{1/} Included in Table 4.

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MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Karonga Livestock Center
(MK)

	<u>Unit Cost</u>	<u>Year 1</u> <u>(1976/77)</u>	<u>Year 2</u> <u>(1977/78)</u>	<u>Year 3</u> <u>(1978/79)</u>	<u>Year 4</u> <u>(1979/80)</u>	<u>Total</u>	<u>Foreign Exchange</u> <u>%</u>	<u>Foreign Exchange</u> <u>Total</u>
Water		220	220	220	220	880	-	-
Labourer	80	(10) 800	(10) 800	(10) 800	(10) 800	3,200	-	-
Herdsmen	80	(3) 240	(3) 240	(3) 240	(3) 240	960	-	-
Fertilizer		850	850	850	850	3,400	90	3,060
Tools and implements		100	100	100	100	400	75	300
Fence maintenance, 10% p.a.		200	200	200	200	800	30	240
Supplementary feed		<u>540</u>	<u>540</u>	<u>540</u>	<u>540</u>	<u>2,160</u>	<u>10</u>	<u>216</u>
Total ^{1/}		<u>2,950</u>	<u>2,950</u>	<u>2,950</u>	<u>2,950</u>	<u>11,800</u>	<u>32</u>	<u>3,816</u>

^{1/} Included in Table 4.

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MALAWI

KARONGA RURAL DEVELOPMENT PROGRAM - PHASE II

Construction Unit
(MK)

	Unit Cost	Grade	Year 1 (1976/77)	Year 2 (1977/78)	Year 3 (1978/79)	Year 4 (1979/80)	Total	F. Exch. £	F. Exch. Total
A. CAPITAL COSTS									
4-wheel drive LWB pick-up	6,670		(4) 26,680	6,670	--	--	33,350	90	30,015
Motor cycle	600		(4) 2,400	1,200	--	--	3,600	90	3,240
Lorry - 7-ton flat	14,850		14,850	14,850	--	--	29,700	90	26,730
Lorry - 7-ton tipper	15,500		(2) 31,000	31,000	--	--	62,000	90	55,800
Lorry - 11-ton flat	22,900		22,900	22,900	--	--	45,800	90	41,220
Tractor - 165	10,280		--	10,280	--	--	10,280	90	9,252
Tractor - 185	11,660		11,660	11,660	--	--	23,320	90	20,988
Tractor and towed grader	13,200		13,200	--	--	--	13,200	90	11,880
Tipping trailer - 6 ton	5,500		5,500	--	--	--	5,500	90	4,950
Trailer for 4-wheel drive	1,200		1,200	--	--	--	1,200	90	1,080
Water bower (500 gals)	1,500		1,500	1,500	--	--	3,000	90	2,700
Office equipment and furniture			2,800	--	--	--	2,800	50	1,000
Tools and equipment			5,000	4,000	1,000	--	10,000	90	9,000
Total A			137,890	104,060	1,000	--	242,950	90	217,875
B. OPERATING COSTS									
(a) Salaries and Wages: 1/ Chief Works Supervisor	4,950	CTO	4,950	4,950	4,950	4,950	19,800	50	9,900
Senior Works Supervisor	2,500	STO	(1) --	(1) --	(1) --	(1) --	--	--	--
Works Supervisor	1,500	TO	(1) --	(1) --	(1) --	(1) --	--	--	--
Senior Irrigation Eng. Assistant(Lufira)	2,500	STO	(1) --	--	--	--	--	--	--
Survey Leveller (Lufira)	600	TA	(1) --	--	--	--	--	--	--
Field Assistant Constr. (Lufira)	600	TA	(1) --	--	--	--	--	--	--
Senior Building Assistant	1,300	STA	(1) --	(1) --	(1) --	(1) --	--	--	--
Draftsman	600	TA	(1) --	(1) --	(1) --	(1) --	--	--	--
Clerical Officer	600	CO	(2) --	(2) --	(2) --	(2) --	--	--	--
Field Assistant Constr.	600	TA	(4) --	(4) --	(4) --	(4) --	--	--	--
Assistant Foreman	360	DA	(10) --	(10) --	(10) --	(10) --	--	--	--
Various other Labourers (incl. Classified Workmen, Plant Operators and Drivers)			--	--	--	--	--	--	--
Subtotal (a)			4,950	4,950	4,950	4,950	19,800	50	9,900
(b) Other Operating Costs:									
Tractor towed grader (rain-fed rice)	4.50/hr.		(788) 3,546	(788) 3,546	(788) 3,546	(788) 3,546	14,184	90	12,766
Driver and 2 Labourers	860		860	860	860	860	3,440	--	--
Completion and maintenance Lufira			10,000	10,000	10,000	10,000	40,000	--	--
Building maintenance 2 1/2% p.a.			--	502	1,004	1,231	2,737	30	821
Borehole maintenance	40		--	1,200	2,360	3,200	6,760	30	2,028
Road maintenance 3% p.a.			--	1,160	2,736	4,313	8,209	30	2,463
Subtotal (b)			14,406	17,268	20,506	23,150	75,330	24	18,078
Total B			19,356	22,218	25,456	28,100	95,130	29	37,978
C. CIVIL WORKS									
Staff houses (Appendix 3)			9,074	9,074	9,074	--	27,222	30	8,167
Offices and stores			5,800	5,000	--	--	10,800	30	3,000
Water supplies - Chitipa			6,000	6,000	--	--	12,000	30	3,600
Traditional house	50	(10)	500	--	--	--	500	--	--
Borehole	2,500	(30)	75,000	(29) 72,500	(21) 58,500	--	200,000	30	60,080
Road construction	1.500/mi.	(12)	18,000	(12) 18,000	(12) 18,000	(8.5) 12,750	66,750	30	20,025
Road improvement	100/mi.	(14)	1,400	(14) 1,400	(14) 1,400	(12.5) 1,250	5,450	30	1,635
Culvert	250	(5)	1,250	(5) 1,250	(5) 1,250	(5) 1,250	5,000	30	1,500
Minor bridge	1,200	(15)	18,000	(22) 26,400	(22) 26,400	(8) 9,600	80,400	30	24,120
Drift	5,500		--	5,500	5,500	--	11,000	30	3,300
Total C			134,284	145,124	114,124	24,850	418,322	30	125,347
Grand Total (A,B,C)			291,470	271,402	140,580	52,950	736,402	49	371,180
Less recurrent costs (Annex 8, Appendix 1)			--	--	10,000	10,000	20,000	--	--
			291,470	271,402	130,580	42,950	736,402	49	371,180

1/ Except for the salary of the Chief Works Supervisor, salaries and wages and plant and vehicle operating costs are included in the unit cost of Civil Works.

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KARONGA RURAL DEVELOPMENT PROGRAM - PHASE II

Research
(MK)

	Unit Cost	Grade	Year 1 (1976/77)	Year 2 (1977/78)	Year 3 (1978/79)	Year 4 (1979/80)	Total	F. Exch %	F. Exch Total
A. CAPITAL COSTS									
4-wheel drive LWB pick-up	6,670		6,670	6,670	--	--	13,340	90	12,006
Motor cycle	600		--	600	--	--	600	90	540
Ploughs and other implements			3,500	--	--	--	3,500	50	1,750
Laboratory and other equipment			4,000	1,000	1,000	1,000	7,000	75	5,250
Work oxen	100/pair	(5)	500	--	--	--	500	--	--
Total A			<u>14,670</u>	<u>8,270</u>	<u>1,000</u>	<u>1,000</u>	<u>24,940</u>	<u>78</u>	<u>19,546</u>
B. OPERATING COSTS									
(a) Salaries and Wages:									
Research Officer	2,700	PO	2,700	2,700	2,700	2,700	10,800	--	--
Senior Field Officer	2,500	STO	2,500	2,500	2,500	2,500	10,000	--	--
Field Officer	1,500	TO (2)	3,000	(2) 3,000	(2) 3,000	(2) 3,000	12,000	--	--
Field Assistant	600	TA (2)	1,200	(4) 2,400	(6) 3,600	(6) 3,600	10,800	--	--
Development Assistant	360	DA (2)	720	(4) 1,440	(4) 1,440	(4) 1,440	5,040	--	--
Clerical Officer	600	CO	600	600	600	600	2,400	--	--
Labourer	80		(30) 2,400	(30) 2,400	(30) 2,400	(30) 2,400	9,600	--	--
Driver	700		(2) 1,400	(2) 1,400	(2) 1,400	(2) 1,400	5,600	--	--
Subtotal (a)			14,520	16,440	17,640	17,640	66,240	--	--
(b) Other Operating Costs:									
4-wheel Drive LWB pick-up 15,000 m/yr at 20t	3,000	(3)	9,000	(3) 9,000	(3) 9,000	(3) 9,000	36,000	90	32,400
Motor cycle 9,000 m/yr at 4t	360		360	360	360	360	1,440	90	1,296
Tractor 165	2.70/hr.	(1200)	3,240	(1200) 3,240	(1200) 3,240	(1200) 3,240	12,960	90	11,664
Seed, fertilizer, insecticides			1,000	2,000	2,000	2,000	7,000	75	5,250
Miscellaneous			1,000	1,000	1,000	1,000	4,000	50	2,000
Bicycle allowance	21	(2)	42	(4) 84	(6) 126	(6) 126	378	--	--
Building maintenance 2 1/2% p.a.			--	416	832	1,209	2,457	30	737
Subtotal (b)			14,642	16,100	16,558	16,935	64,235	83	53,347
Total B			<u>29,162</u>	<u>32,540</u>	<u>34,198</u>	<u>34,575</u>	<u>130,475</u>	<u>41</u>	<u>53,347</u>
C. CIVIL WORKS									
Staff houses (Appendix 3)			15,123	15,123	15,123	--	45,369	30	13,611
Office and store			1,500	1,500	--	--	3,000	30	900
Traditional houses	50	(2)	100	(2) 100	--	--	200	--	--
Access roads			2,000	2,000	--	--	4,000	30	1,200
Total C			<u>18,723</u>	<u>18,723</u>	<u>15,123</u>	<u>--</u>	<u>52,569</u>	<u>30</u>	<u>15,711</u>
Grand Total (A,B&C)			<u>62,552</u>	<u>59,533</u>	<u>50,321</u>	<u>35,572</u>	<u>297,584</u>	<u>43</u>	<u>88,604</u>

ANNEX 2
TABLE 6

March 2, 1976.

MALAWI
KARONGA RURAL DEVELOPMENT PROGRAM - PHASE II

Hydrology
(MK)

	<u>Unit</u> <u>Cost</u>	<u>Grade</u>	<u>Year 1</u> <u>(1976/77)</u>	<u>Year 2</u> <u>(1977/78)</u>	<u>Year 3</u> <u>(1978/79)</u>	<u>Year 4</u> <u>(1979/80)</u>	<u>Total</u>	<u>F. Exch.</u> <u>£</u>	<u>F. Exch.</u> <u>Total</u>
A. CAPITAL COSTS									
4-wheel drive LWB pick-up	6,670		6,670	6,670	--	--	13,340	90	12,006
Motor cycle	600		600	--	--	--	600	90	540
Gauging equipment			7,000	5,000	5,000	--	17,000	90	15,300
Meteorological equipment			2,000	--	--	--	2,000	90	1,800
Miscellaneous			1,500	1,500	--	--	3,000	75	2,250
Total A			<u>17,770</u>	<u>13,170</u>	<u>5,000</u>	<u>--</u>	<u>35,940</u>	<u>89</u>	<u>31,896</u>
B. OPERATING COSTS									
(a) Salaries and Wages:									
Hydrologist	5,700	PO	5,700	5,700	5,700	5,700	22,800	50	11,400
Field Officer	1,500	TO	1,500	1,500	1,500	1,500	6,000	--	--
Field Assistant	600	TA (3)	1,800 (3)	1,800 (3)	1,800 (3)	1,800 (3)	7,200	--	--
Driver	700		700	700	700	700	2,800	--	--
Labourer	80	(15)	1,200 (15)	1,200 (15)	1,200 (15)	1,200 (15)	4,800	--	--
Development Assistant	360	DA (8)	2,880 (8)	2,880 (8)	2,880 (8)	2,880 (8)	11,520	--	--
Subtotal (a)			13,780	13,780	13,780	13,780	55,120	21	11,400
(b) Other operating costs:									
4-wheel drive 15,000 m/yr @ 20¢	3,000	(2)	6,000 (2)	6,000 (2)	6,000 (2)	6,000 (2)	24,000	90	21,600
Motor cycle 6,000 m/yr @ 4¢	240	(2)	480 (2)	480 (2)	480 (2)	480 (2)	1,920	90	1,728
Bicycle allowance	21	(8)	168 (8)	168 (8)	168 (8)	168 (8)	672	--	--
Building maintenance 2 1/2% p.a.			--	76	351	427	854	30	256
Subtotal (b)			6,648	6,724	6,999	7,075	27,446	86	23,584
Total B			<u>20,428</u>	<u>20,504</u>	<u>20,779</u>	<u>20,855</u>	<u>82,566</u>	<u>42</u>	<u>34,984</u>
C. CIVIL WORKS									
Staff houses (Appendix 3)			3,023	3,023	3,023	--	9,069	30	2,721
Office and store			--	8,000	--	--	8,000	30	2,400
Traditional house	50	(8)	400	--	--	--	400	--	--
Total C			<u>3,423</u>	<u>11,023</u>	<u>3,023</u>	<u>--</u>	<u>17,469</u>	<u>29</u>	<u>5,121</u>
Grand Total (A,B&C)			<u>41,621</u>	<u>44,697</u>	<u>28,802</u>	<u>20,855</u>	<u>135,975</u>	<u>53</u>	<u>72,001</u>

March 2, 1976

MALAWI

KARONGA RURAL DEVELOPMENT PROGRAM - PHASE II

Mechanical Maintenance
(MK)

	Unit Cost	Grade	Year 1 (1976/77)	Year 2 (1977/78)	Year 3 (1978/79)	Year 4 (1979/80)	Total	F. Exch. %	F. Exch. Total
A. CAPITAL COSTS									
Mobile workshop	10,000		10,000	--	--	--	10,000	90	9,000
4-wheel drive LWB pick-up	6,670		6,670	6,670	6,670	--	20,010	90	18,009
Mechanical tools			10,000	--	--	--	10,000	90	9,000
Total A			26,670	6,670	6,670	--	40,010	90	36,009
B. OPERATING COSTS:									
(a) Salaries and wages: 1/									
Chief Mechanical Supervisor	4,950	CTO	4,950	4,950	4,950	4,950	19,800	50	9,900
Mechanical Supervisor	1,500	TO	(1) --	(1) --	(1) --	(1) --	--	--	--
Clerical Officer	600	CO	(2) --	(2) --	(2) --	(2) --	--	--	--
Chargehand	800	TA	(2) --	(2) --	(2) --	(2) --	--	--	--
Driver + various mech., welders, etc.	700		--	--	--	--	--	--	--
Subtotal (a)			4,950	4,950	4,950	4,950	19,800	50	9,900
(b) Other Operating Costs: 1/									
Generator 80 KVA			8,500	8,500	8,500	8,500	34,000	90	30,600
Generator 6 KVA			4,900	4,900	4,900	4,900	19,600	90	17,640
Generator 25 KVA			1,800	1,800	1,800	1,800	7,200	90	6,480
Generator 1.5 KVA			320	320	320	320	1,280	90	1,152
Generator 60 KVA			6,000	6,000	6,000	6,000	24,000	90	21,600
Building maintenance 2 1/2% p.a.			--	534	815	967	2,316	30	695
Subtotal (b)			21,520	22,054	22,335	22,487	88,396	88	78,167
Total B			26,470	27,004	27,285	27,437	108,196	81	88,067
C. CIVIL WORKS									
Staff houses (Appendix 3)			6,049	6,049	6,049	--	18,147	30	5,444
Mech. workshop			5,200	--	--	--	5,200	30	1,560
Office and stores			5,200	--	--	--	5,200	30	1,560
Loading ramp			800	--	--	--	800	30	240
Generator house			520	--	--	--	520	30	156
Carport	400	(9)	3,600	--	--	--	3,600	30	1,080
Extension mech. store			--	5,200	--	--	5,200	30	1,560
Total C			21,369	11,249	6,049	--	38,667	30	11,600
Grand Total (A,B&C)			74,509	44,923	40,004	27,437	186,873	73	135,676
Less recurrent costs (Annex 8, Appendix 1)			--	--	5,380	12,160	17,540	82	14,526
			74,509	44,923	34,624	15,277	169,333	72	121,150

ANNEX 8
Table 8

1/ Except for the salary of the Chief Mechanical Supervisor, salaries and wages are included in the unit cost of operating of all Project vehicles and other mechanical equipment.
March 2, 1976.

KARONGA RURAL DEVELOPMENT PROGRAM - PHASE II

ANNEX 6

Finance (Accounting Services)
(MT)

Table 9

	Unit Cost	Grade	Year 1 (1976/77)	Year 2 (1977/78)	Year 3 (1978/79)	Year 4 (1979/80)	Total	F. Exch. Z	F. Exch. Total
A. CAPITAL COSTS									
(a) Accounts Section:									
Light duty pick-up	4,900		--	4,900	--	4,900	9,800	90	8,820
Office furniture and equipment			2,400	1,200	--	--	3,600	50	1,800
Accounting machine L5000			--	15,000	--	--	15,000	90	13,500
Subtotal (a)			2,400	21,100	--	4,900	28,400	85	24,120
(b) Credit Section:									
4-wheel drive LWB pick-up	6,670		(2) 13,340	6,670	--	--	20,010	90	18,009
5-ton lorry	12,650		12,650	--	--	--	12,650	90	11,385
Motor cycle	600		(5) 3,000	(3) 1,800	(2) 1,200	(5) 3,000	9,000	90	8,100
Bicycle	120		(2) 240	--	(2) 240	--	480	90	432
Office furniture and equipment			2,200	2,200	--	--	4,400	50	2,200
Subtotal (b)			31,430	10,670	1,440	3,000	46,540	86	40,126
Total A (a+b)			33,830	31,770	1,440	7,900	74,940	86	64,246
B. OPERATING COSTS									
(a) Salaries and Wages:									
(i) Accounts Section Karonga:									
Principal Accountant	24,000	S9	24,000	24,000	24,000	--	72,000	50	36,000
Principal Accountant	4,050	S9	--	--	--	4,050	4,050	--	--
Senior Accountant	2,500	SEO	2,500	2,500	2,500	2,500	10,000	--	--
Procurement Officer-Blantyre	2,500	SEO	2,500	2,500	2,500	2,500	10,000	--	--
Executive Officer	1,500	EO	(2) 3,000	(2) 3,000	(2) 3,000	(2) 3,000	12,000	--	--
Senior Clerical Officer	1,300	SCO	1,300	1,300	1,300	1,300	5,200	--	--
Clerical Officer	600	CO	(3) 1,800	(3) 1,800	(3) 1,800	(3) 1,800	7,200	--	--
Accounts Assistant	600	CO	(2) 1,200	(2) 1,200	(2) 1,200	(2) 1,200	4,800	--	--
Copy Typist	600	DS	(2) 1,200	(2) 1,200	(2) 1,200	(2) 1,200	4,800	--	--
Driver	700		(2) 1,400	(2) 1,400	(2) 1,400	(2) 1,400	5,600	--	--
Subtotal a(i)			38,900	38,900	38,900	18,950	135,650	27	36,000
(ii) Accounts Section Chitipa:									
Senior Clerical Officer	1,300	SCO	1,300	1,300	1,300	1,300	5,200	--	--
Copy Typist	600	DS	600	600	600	600	2,400	--	--
Messenger	170		170	170	170	170	680	--	--
Subtotal a(ii)			2,070	2,070	2,070	2,070	8,280	--	--
Subtotal a (i+ii)	--		40,970	40,970	40,970	21,020	143,930	25	36,000
(iii) Credit Section Karonga:									
Principal Field Officer	4,950	PO	4,950	4,950	4,950	--	14,850	50	7,425
Principal Field Officer	3,300	CTO	--	--	--	3,300	3,300	--	--
Accountant	1,500	EO	1,500	1,500	1,500	1,500	6,000	--	--
Credit Officer	1,500	TO	1,500	1,500	1,500	1,500	6,000	--	--
Senior Clerical Officer	1,300	SCO	1,300	1,300	1,300	1,300	5,200	--	--
Senior Credit Assistant	1,300	STA	1,300	1,300	1,300	1,300	5,200	--	--
Credit Assistant	600	TA	(2) 1,200	(5) 3,000	(9) 5,400	(12) 7,200	16,800	--	--
Development Assistant	360	DA	(10) 3,600	(7) 2,520	(3) 1,080	--	7,200	--	--
Temporary Labourer (6 months)	270		(36) 4,860	(42) 5,670	(46) 6,210	(46) 6,210	22,950	--	--
Drivers	700		(2) 1,400	(2) 1,400	(2) 1,400	(2) 1,400	5,600	--	--
Subtotal a(iii)			21,610	23,140	24,640	23,710	93,100	8	7,425
(iv) Credit Section Chitipa:									
Senior Clerical Officer	1,300	SCO	1,300	1,300	1,300	1,300	5,200	--	--
Credit Officer	1,500	TO	1,500	1,500	1,500	1,500	6,000	--	--
Credit Assistant	600	TA	(4) 2,400	(5) 3,000	(8) 4,800	(8) 4,800	15,000	--	--
Driver	700		(3) 2,100	(3) 2,100	(2) 1,400	(2) 1,400	7,000	--	--
Subtotal a(iv)			7,300	7,900	9,000	9,000	33,200	--	--
Subtotal a(iii+iv)			28,910	31,040	33,640	32,710	126,300	6	7,425
Subtotal (a)			69,880	72,010	74,610	53,730	270,230	16	43,425
(b) Other Operating Costs									
(i) Accounts Section:									
Light car 15,000 m/yr @ 11t	1,650		(2) 3,300	(2) 3,300	(2) 3,300	(2) 3,300	13,200	90	11,880
Light duty pick-up 20,000 m/yr @ 13t	2,600		2,600	2,600	2,600	2,600	10,400	90	9,360
Printing and stationery			2,500	2,500	2,500	2,500	10,000	75	7,500
Maintenance Blantyre office			3,000	3,000	3,000	3,000	12,000	25	3,000
Subtotal b(i)			11,400	11,400	11,400	11,400	45,600	70	31,740
(ii) Credit Section:									
4-wheel drive LWB pick-up 15,000 m/yr @ 20t	4,000		(3) 12,000	(4) 16,000	(4) 16,000	(4) 16,000	60,000	90	54,000
Motor cycle 15,000 m/yr @ 4t	600		(8) 4,800	(9) 5,400	(9) 5,400	(9) 5,400	21,000	90	18,900
Lorry 5-ton 6,000 m/yr @ 34t	2,040		(2) 4,080	(2) 4,080	2,040	2,040	12,240	90	11,016
Bicycle allowance	21		(16) 336	(17) 357	(20) 420	(20) 420	1,533	--	--
Stationery			5,000	5,000	5,000	5,000	20,000	75	15,000
Subtotal b(ii)			26,216	30,837	28,860	28,860	114,773	86	98,916
(iii) Building maintenance 2 1/2% p.a.			--	1,201	2,177	3,084	6,462	30	1,939
Subtotal b			37,616	43,438	42,437	43,344	166,835	79	132,595
Total B (a+b)			107,496	115,448	117,047	97,074	437,065	40	176,020
C. CIVIL WORKS									
Staff Houses (Appendix 3)			36,297	36,296	36,296	9,600	118,489	30	35,547
Offices - Accounts	12/sq.ft.		(488) 5,856	(160) 1,920	--	--	7,776	30	2,333
Offices - Credit	12/sq.ft.		(225) 2,700	--	--	--	2,700	30	810
Input Stores	400		(8) 3,200	(2) 800	--	--	4,000	30	1,200
Traditional House	50		(10) 500	--	--	--	500	--	--
Total C			48,553	39,016	36,296	9,600	133,465	30	39,890
Grand Total (A,B,C)			189,879	186,234	154,783	114,574	685,470	43	280,156
Less recurrent costs			--	--	6,500	13,800	20,300	--	--
(Annex 8, Appendix 1)			189,879	186,234	148,283	100,774	625,170	43	280,156

MALAWI
KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Evaluation
(MK)

	<u>Unit</u> <u>Cost</u>	<u>Grade</u>	<u>Year 1</u> <u>(1976/77)</u>	<u>Year 2</u> <u>(1977/78)</u>	<u>Year 3</u> <u>(1978/79)</u>	<u>Year 4</u> <u>(1979/80)</u>	<u>Total</u>	<u>F. Exch.</u> <u>%</u>	<u>F. Exch.</u> <u>Total</u>
A. CAPITAL COSTS									
4-wheel drive LWB	7,880		7,880	--	7,880	--	15,760	90	141,184
Motor cycle	600		(2) 1,200	600	--	--	1,800	90	1,620
Survey and field equipment			1,100	450	450	--	2,000	90	1,800
Tentage			600	600	--	--	1,200	90	1,080
Bicycle	120		(6) 720	--	(6) 720	--	1,440	90	1,296
Calculator			500	--	--	--	500	90	450
Total A			<u>12,000</u>	<u>1,650</u>	<u>9,050</u>	<u>--</u>	<u>22,700</u>	<u>90</u>	<u>20,430</u>
B. OPERATING COSTS									
(a) Salaries and Wages:									
Economist	5,700	PO	5,700	5,700	5,700	5,700	22,800	50	11,400
Statistician/Data Processor	1,500	TO	1,500	1,500	1,500	1,500	6,000	--	--
Field Officer	1,500	TO	(2) 3,000	(2) 3,000	(2) 3,000	(2) 3,000	12,000	--	--
Field Assistant	600	TA	(4) 2,400	(4) 2,400	(2) 1,200	(2) 1,200	7,200	--	--
Field Enumerator	360	DA	(18) 6,480	(18) 6,480	(12) 4,320	(12) 4,320	21,600	--	--
Clerical Officer	600	CO	600	600	600	600	2,400	--	--
Labourer	80		(18) 1,440	(18) 1,440	(12) 960	(12) 960	4,800	--	--
Driver	700		(2) 1,400	(2) 1,400	(2) 1,400	(2) 1,400	5,600	--	--
Subtotal (a)			22,520	22,520	18,680	18,680	82,400	14	11,400
(b) Other Operating Costs:									
4-wheel drive LWB 24,000 m/yr at 21t	5,040		(2) 10,080	(2) 10,080	(2) 10,080	(2) 10,080	40,320	90	36,288
Motor cycle 10,000 m/yr at 4t	400		(4) 1,600	(4) 1,600	(2) 800	(2) 800	4,800	90	4,320
Bicycle allowance	21		(12) 252	(12) 252	(6) 126	(6) 126	756	--	--
Building maintenance 2 1/2% p.a.			--	227	454	681	1,362	30	409
Subtotal (b)			11,932	12,159	11,460	11,687	47,238	87	41,017
Total B			<u>34,452</u>	<u>34,679</u>	<u>30,140</u>	<u>30,367</u>	<u>129,638</u>	<u>40</u>	<u>52,417</u>
C. CIVIL WORKS									
Staff houses (Appendix 3)			9,074	9,074	9,074	--	27,222	30	8,167
Traditional houses	50		(5) 250	(5) 250	(5) 250	(5) 250	1,000	--	--
Total C			<u>9,324</u>	<u>9,324</u>	<u>9,324</u>	<u>250</u>	<u>28,222</u>	<u>29</u>	<u>8,167</u>
Grand Total (A,B,C)			<u>55,776</u>	<u>45,653</u>	<u>48,514</u>	<u>30,617</u>	<u>180,560</u>	<u>45</u>	<u>81,014</u>

March 2, 1976.

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT -- PHASE II

Management Unit
(MK)

	Unit Cost	Grade	Year 1 (1976/77)	Year 2 (1977/78)	Year 3 (1978/79)	Year 4 (1979/80)	Total	F. Exch. £	F. Exch. Total
A. CAPITAL COSTS									
(a) Karonga:									
4-wheel drive LWB 10 seater	7,880		7,880	--	---	7,880	15,760	90	14,184
4-wheel drive LWB pick-up	6,670		--	6,670	--	--	6,670	90	6,003
Motor cycle	600		600	--	--	--	600	90	540
Office equipment and furniture			600	600	--	--	1,200	50	600
Bicycle	120		(3) 360	--	120	120	600	90	540
Subtotal (a)			9,440	7,270	120	8,000	24,830	88	21,867
(b) Chitipa:									
Office furniture and equipment			600	600	600	--	1,800	50	900
Radio equipment			4,500	4,500	--	--	9,000	90	8,100
Telephone installation			1,000	--	--	--	1,000	90	900
Bicycle	120		120	--	120	--	240	90	216
Subtotal (b)			6,220	5,100	720	--	12,040	84	10,116
Total A (a,b)			15,660	12,370	840	8,000	36,870	87	31,983
B. OPERATING COSTS									
(a) Salaries and Wages:									
Project Manager	4,700	S7	4,700	4,700	4,700	4,700	18,800	--	--
Assistant Project Manager	4,450	S8	4,450	4,450	4,450	4,450	17,800	--	--
Senior Executive Officer	2,500	SEO	2,500	2,500	2,500	2,500	10,000	--	--
Executive Officer	1,500	EO	1,500	1,500	1,500	1,500	6,000	--	--
Senior Clerical Officer	1,300	SCO	1,300	1,300	1,300	1,300	5,200	--	--
Clerical Officer	600	CO	(4) 2,400	(4) 2,400	(4) 2,400	(4) 2,400	9,600	--	--
Development Assistant (Clerical)	360	DA	(5) 1,800	(5) 1,800	(5) 1,800	(5) 1,800	7,200	--	--
Stenographer	1,600	DL	1,600	1,600	1,600	1,600	6,400	--	--
Copy Typist	600	DS	600	600	600	600	2,400	--	--
Telephone Operator	600	CO	(2) 1,200	(2) 1,200	(2) 1,200	(2) 1,200	4,800	--	--
Messenger	170	SCIV	(5) 850	(5) 850	(5) 850	(5) 850	3,400	--	--
Watchman	170	SCIV	(6) 1,020	(6) 1,020	(6) 1,020	(6) 1,020	4,080	--	--
Driver	700		(2) 1,400	(2) 1,400	(2) 1,400	(2) 1,400	5,600	--	--
Subtotal (a)			25,320	25,320	25,320	25,320	101,280	--	--
(b) Other Operating Costs:									
4-wheel drive LWB 10s - 15,000 m/yr at 22t	3,300		(2) 6,600	(2) 6,600	(2) 6,600	(2) 6,600	26,400	90	23,760
4-wheel drive LWB pick-up - 15,000 m/yr at 20t	3,000		3,000	3,000	3,000	3,000	12,000	90	10,800
Motor cycle - 10,000 m/yr at 4t	400		400	400	400	400	1,600	90	1,440
Telephone and postage			5,000	5,000	5,000	5,000	20,000	20	4,000
Water			1,200	1,200	1,200	1,200	4,800	--	--
Radio licenses			100	100	100	100	400	--	--
Stationery			5,000	5,000	5,000	5,000	20,000	75	15,000
Technical Journals			600	600	600	600	2,400	90	2,160
Air fare	90		(50) 4,500	(50) 4,500	(50) 4,500	(50) 4,500	18,000	75	13,500
Charter flight	600		(2) 1,200	(2) 1,200	(2) 1,200	(2) 1,200	4,800	75	3,600
Subsistence allowance			3,500	3,500	3,500	3,500	14,000	--	--
New staff appointments			800	800	800	800	3,200	20	640
Vehicle insurance	50		(3) 150	(3) 150	(3) 150	(3) 150	600	--	--
Subtotal (b)			32,050	32,050	32,050	32,050	128,200	58	74,180
Total B (a,b)			57,370	57,370	57,370	57,370	229,480	32	74,180
C. CIVIL WORKS									
Traditional house	50		(5) 250	--	--	--	250	--	--
Grand Total (A, B,C)			73,280	69,740	58,230	65,370	266,600	40	106,163
Less recurrent cost (Annex 3, Appendix 1)			--	960	2,320	8,830	12,110	--	--
			73,280	70,700	60,550	74,200	254,490	42	106,163

March 2, 1976.

ANNEX 3
Table 11

MALAWI
KARONGA RURAL DEVELOPMENT PROJECT - PHASE II
Markets and Input Stores (ADMARC)
(MK)

	<u>Unit</u> <u>Cost</u>	<u>Year 1</u> <u>(1976/77)</u>	<u>Year 2</u> <u>(1977/78)</u>	<u>Year 3</u> <u>(1978/79)</u>	<u>Year 4</u> <u>(1979/80)</u>	<u>Total</u>	<u>F. Exch.</u> <u>%</u>	<u>F. Exch.</u> <u>Total</u>
(a) Karonga: Market and input store complex	50,000	(2) 100,000	(2) 100,000	(2) 100,000	--	300,000	30	90,000
(b) Chitipa: Market and input store complex	50,000	50,000	50,000	50,000	--	150,000	30	45,000
Small input sheds	2,000	(4) 8,000	(4) 8,000	--	--	16,000	30	4,800
Total		<u>158,000</u>	<u>158,000</u>	<u>150,000</u>	<u>--</u>	<u>466,000</u>	<u>30</u>	<u>139,800</u>

March 2, 1976

MALAWI
KARONGA RURAL DEVELOPMENT PROGRAM - PHASE II

ANNEX 8
Table 13

		Health (MK)		Year 1 (1976/77)	Year 2 (1977/78)	Year 3 (1978/79)	Year 4 (1979/80)	Total	F. Exch. %	F. Exch. Total
	Unit Cost	Grade								
I. Karonga										
A. CAPITAL COSTS										
4-wheel drive - Kaporo	7,880			7,880	--	--	--	7,880	90	7,092
4-wheel drive - Bilharzia Control	7,880			--	7,880	--	--	7,880	90	7,092
Total A				7,880	7,880	--	--	15,760	90	14,184
B. OPERATING COSTS										
(a) Salaries and Wages: 1/										
Driver - Kaporo	700			700	700	700	700	2,800	--	--
EN/M - Songwe	480	TA		--	480	480	480	1,440	--	--
HA - Songwe	600	TA		--	600	600	600	1,800	--	--
FWA - Songwe	150			--	150	150	150	450	--	--
EN/M - Mpata	480	TA		--	--	480	480	960	--	--
HA - Mpata	600	TA		--	--	600	600	1,200	--	--
FWA - Mpata	150			--	--	150	150	300	--	--
EN/M - Lupembe	480	TA		--	--	480	480	960	--	--
HA - Lupembe	600	TA		--	--	600	600	1,200	--	--
FWA - Lupembe	150			--	--	150	150	300	--	--
HI - Bilharzia Control	2,500	STD		2,500	2,500	2,500	2,500	10,000	--	--
Driver - Bilharzia Control	700			700	700	700	700	2,800	--	--
Labourer	80			(6) 480	(6) 480	(6) 480	(6) 480	1,920	--	--
Subtotal (a)				4,380	5,610	8,070	8,070	26,130	--	--
(b) Other Operating Costs:										
4-wheel drive 15,000 m/yr @ 21t	3,150			(2) 6,300	(2) 6,300	(2) 6,300	(2) 6,300	25,200	90	22,680
Borehole maintenance	40			--	--	(2) 80	(2) 80	160	30	48
Building maintenance 2 1/2% p.a.				--	660	1,980	1,980	4,620	30	1,386
Subtotal (b)				6,300	6,960	8,360	8,360	29,980	80	24,114
(c) Drugs and supplies:										
Drugs - Songwe				--	600	600	600	1,800	75	1,350
Drugs - Mpata				--	--	600	600	1,200	75	900
Drugs - Lupembe				--	--	600	600	1,200	75	900
Drugs - Bilharzia Control				4,000	4,000	4,000	4,000	16,000	75	12,000
Molluscicides				2,500	2,500	2,500	2,500	10,000	75	7,500
Subtotal (c)				6,500	7,100	8,300	8,300	30,200	75	22,650
Total B				17,180	19,670	24,730	24,730	86,310	54	46,784
C. CIVIL WORKS										
Maternity Ward - Songwe				20,000	--	--	--	20,000	30	6,000
Maternity Ward - Mpata				--	20,000	--	--	20,000	30	6,000
Maternity Ward - Lupembe				--	20,000	--	--	20,000	30	6,000
Staff House - Songwe (type D)	3,200			(2) 6,400	--	--	--	6,400	30	1,920
Staff House - Mpata (type D)	3,200			--	(2) 6,400	--	--	6,400	30	1,920
Staff House - Lupembe (type D)	3,200			--	(2) 6,400	--	--	6,400	30	1,920
Borehole - Mpata	2,500			--	2,500	--	--	2,500	30	750
Borehole - Lupembe	2,500			--	2,500	--	--	2,500	30	750
Total C				26,400	57,800	--	--	84,200	30	25,260
Total I (Karonga)				51,460	85,350	24,730	24,730	186,270	46	86,208
II. Chitipa										
A. CAPITAL COSTS										
4-wheel drive - Misuku	7,880			7,880	--	--	--	7,880	90	7,092
B. OPERATING COSTS										
(a) Salaries and Wages:										
HA - Misuku	600	TA		--	600	600	600	1,800	--	--
EN/M - Misuku	480	TA		--	(2) 960	(2) 960	960	2,880	--	--
FWA - Misuku	150			--	150	150	150	450	--	--
Driver - Misuku	700			--	700	700	700	2,800	--	--
HA - Ifumbo	600	TA		--	600	600	600	2,400	--	--
EN/M - Kaneme	480	TA		--	--	480	480	960	--	--
HA - Kaneme	600	TA		--	--	600	600	1,200	--	--
FWA - Kaneme	150			--	--	150	150	300	--	--
HA - Wanya	600	TA		--	600	600	600	2,400	--	--
HA - Nthalire	600	TA		--	600	600	600	2,400	--	--
HECW - Health Posts 2/	380	TA		--	(3) 1,140	(7) 2,660	(7) 2,660	6,460	--	--
Subtotal (a)				2,500	5,350	8,100	8,100	24,050	--	--
(b) Other Operating Costs:										
4-wheel drive 15,000 m/yr @ 21t	3,150			3,150	3,150	3,150	3,150	12,600	90	11,340
Borehole maintenance	40			--	(2) 80	(2) 80	(2) 80	240	30	72
Building maintenance 2 1/2% p.a.				--	1,805	3,285	3,285	8,375	30	2,513
Subtotal (b)				3,150	5,035	6,515	6,515	21,215	66	13,925
(c) Drugs and Supplies:										
Drugs - Misuku - maternity				--	600	600	600	1,800	75	1,350
Drugs - Misuku - mobile clinics				--	1,500	1,500	1,500	4,500	75	3,375
Drugs - Ifumbo				600	600	600	600	2,400	75	1,800
Drugs - Kaneme				--	--	600	600	1,200	75	900
Drugs - Wanya				600	600	600	600	2,400	75	1,800
Drugs - Nthalire				600	600	600	600	2,400	75	1,800
Drugs - Health Posts	500			--	(3) 1,500	(7) 3,500	(7) 3,500	8,500	75	6,375
Subtotal (c)				1,800	5,400	8,000	8,000	23,200	75	17,400
Total B				7,450	15,785	22,615	22,615	68,465	46	31,325
C. CIVIL WORKS										
Maternity Ward - Misuku				20,000	--	--	--	20,000	30	6,000
Maternity Ward - Kaneme				--	20,000	--	--	20,000	30	6,000
Health Post 2/	5,000			(3) 15,000	(4) 20,000	--	--	35,000	30	10,500
Water Supply - Misuku				2,000	--	--	--	2,000	30	600
Staff House - Misuku - type D	3,200			--	--	--	--	12,800	30	3,840
Staff House - Ifumbo - type D	3,200			(2) 6,400	--	--	--	6,400	30	1,920
Staff House - Kaneme - type D	3,200			--	(2) 6,400	--	--	6,400	30	1,920
Staff House - Wanya - type D	3,200			3,200	--	--	--	3,200	30	960
Staff House - Nthalire - type D	3,200			3,200	--	--	--	3,200	30	960
Staff House - Health Posts - type D	3,200			(3) 9,600	(4) 12,800	--	--	22,400	30	6,720
Borehole - Ifumbo	2,500			2,500	--	--	--	2,500	30	750
Borehole - Wanya	2,500			2,500	--	--	--	2,500	30	750
Total C				77,200	59,200	--	--	136,400	30	40,920
Total II (Chitipa)				92,530	74,985	22,615	22,615	212,745	37	79,337
Grand Total I & II				143,990	160,335	47,345	47,345	399,015	41	165,545

- 1/ EN/M - Enrolled Nurse/Mid-wife
FWA - Female Ward Attendant
HA - Health Assistant
HECW - Health Homecraft Worker
HI - Health Inspector
MA - Medical Assistant

- 2/ Locations of proposed health posts: Chisenga, Ipenza, Kapoka, Kavukuku, Kopsakopa, Sokora, and Thereare

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

NRDP - Preinvestment Phase

Central Services - Land Resources Survey
(MK)

	<u>Unit</u> <u>Cost</u>	<u>Grade</u>	<u>Year 1</u> <u>(1976/77)</u>	<u>Year 2</u> <u>(1977/78)</u>	<u>Total</u>	<u>F. Exch.</u> <u>%</u>	<u>F. Exch.</u> <u>%</u>
A. CAPITAL COSTS							
Airphotography and orthophoto maps			25,000	25,000	50,000	90	45,000
Miscellaneous equipment			<u>1,000</u>	<u>1,000</u>	<u>2,000</u>	<u>90</u>	<u>1,800</u>
Total A			<u>26,000</u>	<u>26,000</u>	<u>52,000</u>	<u>90</u>	<u>46,800</u>
B. OPERATING COSTS ^{1/}							
(a) Salaries and Wages:							
Senior Professional Officer	5,700	PO	5,700	5,700	11,400	50	5,700
Professional Officer	2,700	PO	(2) 4,050	(2) 5,400	9,450	--	--
Technical Officer	1,500	TO	1,500	1,500	3,000	--	--
Technical Assistant	600	TA	(2) 600	(2) 1,200	1,800	--	--
Subtotal (a)			11,850	13,800	25,650	22	5,700
(b) Other Operating Costs:							
Landset imagery processing			2,600	2,600	5,200	90	4,680
Travel allowance			4,700	4,700	9,400	50	4,700
Office rent			4,000	4,000	8,000	--	--
Maps and office materials			4,400	4,400	8,800	75	6,600
Charter air reconnaissance			1,000	1,000	2,000	90	1,800
Caravan hire			1,600	1,600	3,200	50	1,600
Building maintenance 2 1/2% p.a.			--	540	540	30	162
Subtotal (b)			18,300	18,840	37,140	53	19,542
Total B			<u>30,150</u>	<u>32,640</u>	<u>62,790</u>	<u>40</u>	<u>25,242</u>
C. CIVIL WORKS							
Staff houses							
Type A	17,600		17,600	--	17,600	30	5,280 -
Type D	2,000		(2) 4,000	--	4,000	30	1,200
Site development charges	2,000		(3) 6,000	--	6,000	30	1,800
Total C			<u>27,600</u>	<u>--</u>	<u>27,600</u>	<u>30</u>	<u>8,280</u>
Grand Total (A,B,C)			<u>83,750</u>	<u>58,640</u>	<u>142,390</u>	<u>56</u>	<u>80,322</u>

^{1/} For newly recruited staff 6 months of Year I only.

March 2, 1976

MALAWI
KARONGA RURAL DEVELOPMENT PROJECT - PHASE II
NRDP - Preinvestment Phase
Central Services - Agro-Economic Survey
(MK)

	<u>Unit</u> <u>Cost</u>	<u>Grade</u>	<u>Year 1</u> <u>(1976/77)</u>	<u>Year 2</u> <u>(1977/78)</u>	<u>Total</u>	<u>F. Exch.</u> <u>%</u>	<u>F. Exch.</u> <u>Total</u>
A. CAPITAL COSTS							
Motorcycle	600		(2) 1,200	--	1,200	90	1,080
Calculator	300		(4) 1,200	--	1,200	90	1,080
Office furniture			500	500	1,000	50	500
Field equipment			1,500	1,500	3,000	90	2,700
Total A			<u>4,400</u>	<u>2,000</u>	<u>6,400</u>	<u>84</u>	<u>5,360</u>
B. OPERATING COSTS 1/							
(a) Salaries and Wages:							
Professional Officer	2,700	PO	(2) 5,400	(2) 5,400	10,800	--	--
Senior Technical Officer	2,500	STO	1,250	2,500	3,750	--	--
Senior Technical Assistant	1,300	STA	650	1,300	1,950	--	--
Senior Statistical Clerk	1,300	SCO	650	1,300	1,950	--	--
Statistical Clerk	600	CO	(2) 1,200	(2) 1,200	2,400	--	--
Temporary Staff			<u>2,000</u>	<u>2,000</u>	<u>4,000</u>	<u>--</u>	<u>--</u>
Subtotal (a)			11,150	13,700	24,850	--	--
(b) Other Operating Costs:							
4-wheel drive 15,000 m/yr @ 21t	3,150		(3) 9,450	(3) 9,450	18,900	90	17,010
PVHO charges (lorry)			4,000	4,000	8,000	75	6,000
Motorcycle 10,000 m/yr @ 4t	400		(2) 400	(2) 800	1,200	90	1,080
Travel allowance			1,500	1,500	3,000	50	1,500
Training			250	250	500	50	250
Maps and office materials			2,500	2,500	5,000	50	2,500
Computer time			2,000	2,000	4,000	50	2,000
Building maintenance 2 1/2% p.a.			--	486	486	30	146
Subtotal (b)			20,100	20,986	41,086	74	30,486
Total B			<u>31,250</u>	<u>34,686</u>	<u>65,936</u>	<u>46</u>	<u>30,486</u>
C. CIVIL WORKS							
Staff houses							
Type B	7,250		7,250	--	7,250	30	2,175
Type C	4,100		(2) 8,200	--	8,200	30	2,460
Type D	2,000		(2) 4,000	--	4,000	30	1,200
Site development charges	2,000		(5) 10,000	--	10,000	30	3,000
Total C			<u>29,450</u>	<u>--</u>	<u>29,450</u>	<u>30</u>	<u>8,835</u>
Grand Total (A,B,C)			<u>65,100</u>	<u>36,686</u>	<u>101,786</u>	<u>44</u>	<u>44,681</u>

1/ For newly recruited staff 6 months of Year I only.

March 2, 1976

MALAWI
KARONGA RURAL DEVELOPMENT PROJECT - PHASE II
NRDP - Preinvestment Phase
Central Services - Crop Experiments
(MK)

	<u>Unit</u> <u>Cost</u>	<u>Grade</u>		<u>Year 1</u> <u>(1976/77)</u>		<u>Year 2</u> <u>(1977/78)</u>		<u>Total</u>	<u>F. Exch.</u> <u>%</u>	<u>F. Exch.</u> <u>Total</u>
A. CAPITAL COSTS										
Motorcycle	600			<u>600</u>		<u>--</u>		<u>600</u>	<u>90</u>	<u>540</u>
B. OPERATING COSTS <u>1/</u>										
(a) Salaries and Wages:										
Technical Officer	1,500	TO	(2)	3,000	(2)	3,000		6,000	--	--
Senior Technical Assistant	1,300	STA		650		1,300		1,950	--	--
Technical Assistant	600	TA	(2)	600	(5)	3,000		3,600	--	--
Labourer	80		(25)	<u>2,000</u>	(50)	<u>4,000</u>		<u>6,000</u>	<u>--</u>	<u>--</u>
Subtotal (a)				6,250		11,300		17,550		
(b) Other Operating Costs:										
4-wheel drive 15,000 m/yr at 21t	3,150		(2)	6,300	(2)	6,300		12,600	90	11,340
PUHO charges (six experimental plots)	150		(6)	900	(6)	900		1,800	75	1,350
Travel allowance				1,100		1,100		2,200	50	1,100
Bicycle allowance	21		(2)	21	(5)	105		126	--	--
Fertilizer and seed trials				4,500		4,500		9,000	75	6,750
Motorcycle 10,000 m/yr at 4t	400			400		400		800	90	720
Building maintenance 2½% p.a.				<u>--</u>		<u>243</u>		<u>243</u>	<u>30</u>	<u>73</u>
Subtotal (b)				13,221		13,548		26,769	80	21,333
Total B				<u>19,471</u>		<u>24,848</u>		<u>44,319</u>	<u>48</u>	<u>21,333</u>
C. CIVIL WORKS										
Staff houses										
Type C - Mwanza	4,100			4,100		--		4,100	30	1,230
Type D - Henga & Mzimba	2,800		(2)	5,600		--		5,600	30	1,680
Type D - Gowa, Chonde & Ntchisi	2,000			<u>--</u>	(3)	<u>6,000</u>		<u>6,000</u>	<u>30</u>	<u>1,800</u>
Total C				<u>9,700</u>		<u>6,000</u>		<u>15,700</u>	<u>30</u>	<u>4,710</u>
Grand Total (A, B & C)				<u>29,771</u>		<u>30,848</u>		<u>60,619</u>	<u>44</u>	<u>26,583</u>

1/ For newly recruited staff 6 months of Year I only.

March 2, 1976

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

NRDP - Preinvestment Phase

Central Services - Evaluation Unit (Mzuzu)
(MK)

	<u>Unit Cost</u>	<u>Grade</u>	<u>Year 1 (1976/77)</u>	<u>Year 2 (1977/78)</u>	<u>Total</u>	<u>F. Exch. %</u>	<u>F. Exch. Total</u>
A. CAPITAL COSTS							
4-wheel drive LWB pick-up	6,670		6,670	--	6,670	90	6,003
Motorcycle	600		600	--	600	90	540
Bicycle	120		(2) 240	--	240	90	216
Survey and field equipment			2,000	--	2,000	90	1,800
Office equipment and furniture			<u>1,000</u>	<u>--</u>	<u>1,000</u>	<u>75</u>	<u>750</u>
Total A			<u>10,510</u>	<u>--</u>	<u>10,510</u>	<u>89</u>	<u>9,309</u>
B. OPERATING COSTS ^{1/}							
(a) Salaries and Wages:							
Professional Officer	5,700	PO	2,850	5,700	8,550	50	4,275
Technical Officer	1,500	TO	750	1,500	2,250	--	--
Technical Assistant	600	TA	(3) 900	(3) 1,800	2,700	--	--
Development Assistant	360	DA	(9) 1,620	(9) 3,240	4,860	--	--
Clerk/Typist	600	D	300	600	900	--	--
Labourer	80		(6) 240	(6) 480	720	--	--
Subtotal (a)			6,660	13,320	19,980	21	4,275
(b) Other Operating Costs:							
4-wheel drive 15,000 m/yr at 20t	3,000		1,500	3,000	4,500	90	4,050
Motorcycle 10,000 m/yr at 4t	400		200	400	600	90	540
Bicycle allowance	21		(3) 32	(3) 63	95	--	--
Office materials			500	1,000	1,500	50	750
Computer time			150	300	450	50	225
Travel allowance			260	520	780	--	--
Building maintenance 2 1/2% p.a.			--	<u>1,393</u>	<u>1,393</u>	<u>30</u>	<u>418</u>
Subtotal (b)			2,642	6,676	9,318	64	5,983
Total B			<u>9,302</u>	<u>19,996</u>	<u>29,298</u>	<u>35</u>	<u>10,258</u>
C. CIVIL WORKS							
Staff houses							
Type A	24,700		24,700	--	24,700	30	7,410
Type B	10,200		10,200	--	10,200	30	3,060
Type D	2,800		(4) 11,200	--	11,200	30	3,360
Traditional house	50		(9) 450	--	450	--	--
Offices	12/sq.ft.		(800) 9,600	--	9,600	30	2,880
Total C			<u>56,150</u>	<u>--</u>	<u>56,150</u>	<u>30</u>	<u>16,710</u>
Grand Total (A, B & C)			<u>75,962</u>	<u>19,996</u>	<u>95,958</u>	<u>38</u>	<u>36,277</u>

1/ For newly recruited staff 6 months of Year I only.

March 2, 1976

MALAWI
KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

NRDP - Preinvestment Phase

Central Services - Accounts, Road Construction and Consultancies
(MK)

	Unit Cost	Grade	Year 1 (1976/77)	Year 2 (1977/78)	Total	F. Exch. Z	F. Exch. Total
A. CAPITAL COSTS							
4-wheel drive pick-up	6,670		6,670	6,670	13,340	90	12,006
Caravan	4,500		--	4,500	4,500	90	4,050
Bulldozer - D6	77,400		--	77,400	77,400	90	69,660
Grader - 12F	52,650		--	52,650	52,650	90	47,385
Front end loader - 920F	58,500		--	58,500	58,500	90	52,650
Roller	29,250		--	29,250	29,250	90	26,325
Water tanker	10,600		--	10,600	10,600	90	9,540
Lorry 7-ton flat	14,850		--	14,850	14,850	90	13,365
Lorry 7-ton tipper	15,500		--	(3) 46,500	46,500	90	41,850
Tractor - 165 type	10,280		--	10,280	10,280	90	9,252
Tipping trailer - 6-ton	5,500		--	5,500	5,500	90	4,950
Office equipment and furniture (Development Accounts Section)			4,800	1,100	5,900	50	2,950
Office equipment and furniture (Credit Accounts Section)			--	2,550	2,550	50	1,275
Office equipment and furniture (Field Credit Section)			--	750	750	50	375
Office equipment and furniture (Construction Unit)			--	2,000	2,000	50	1,000
Total A			<u>11,470</u>	<u>323,100</u>	<u>334,570</u>	<u>82</u>	<u>296,633</u>
B. OPERATING COSTS ^{1/}							
(a) Salaries and Wages:							
Financial Controller	30,000 ^{2/}	SR	26,000	26,000	52,000	100	52,000
Systems Analyst/Programmer	30,000	PO	15,000	30,000	45,000	75	33,750
Construction and Conservation Officer	30,000	SR	30,000	30,000	60,000	100	60,000
Chief Accountant	3,300	CEO	1,650	3,300	4,950	--	--
Senior Accountant-Development Accounts Section	2,500	SEO	1,250	2,500	3,750	--	--
Accountant-Development Accounts Section	1,500	EO	(4) 3,000	(4) 6,000	9,000	--	--
Accounts Assistant-Development Accounts Section	600	CO	(4) 1,200	(4) 2,400	3,600	--	--
Accountant-Credit Accounts Section	1,500	BO	750	1,500	2,250	--	--
Senior Accounts Assistant-Credit Accounts Section	1,300	SCO	650	1,300	1,950	--	--
Field Officer-Credit Accounts Section	1,500	TO	750	1,500	2,250	--	--
Accounts Assistant-Credit Accounts Section	600	CO	(2) 600	(2) 1,200	1,800	--	--
Subtotal (a)			80,850	105,700	186,550	78	145,750
(b) Other Operating Costs:							
4-wheel drive 15,000 m/yr at 20c	3,000		2,000	3,000	5,000	90	4,500
Travel allowance			2,000	5,000	7,000	--	--
Office rent			2,000	4,000	6,000	--	--
Office materials			2,000	4,000	6,000	50	3,000
Building maintenance 2 1/2% p.a.			--	2,861	2,861	30	858
Subtotal (b)			8,000	18,861	26,861	31	8,358
(c) Studies and Consultancies:							
Coffee study			45,000	--	45,000	80	36,000
Project preparation			10,000	10,000	20,000	80	16,000
Consultancies			30,000	30,000	60,000	80	48,000
Subtotal (c)			85,000	40,000	125,000	80	100,000
Total B			<u>173,850</u>	<u>164,561</u>	<u>338,411</u>	<u>74</u>	<u>254,108</u>
C. CIVIL WORKS							
Staff houses							
Type A	17,600		17,600	--	17,600	30	5,280
Type B	7,250	(7)	50,780	--	50,780	30	15,225
Type C	4,100		4,100	--	4,100	30	1,230
Type D	2,000	(6)	12,000	--	12,000	30	3,600
Site development charges	2,000	(15)	30,000	--	30,000	30	9,000
Total C			<u>114,450</u>	<u>--</u>	<u>114,450</u>	<u>30</u>	<u>34,335</u>
Grand Total (A,B,C)			<u>299,700</u>	<u>487,661</u>	<u>787,431</u>	<u>74</u>	<u>585,076</u>

^{1/} For newly recruited staff 6 months of Year 1 only.
^{2/} Of which MK 4,000 provided under ILDP III

March 2, 1976

ANNEX 8
TABLE 10

MALAWI
KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

NRDP - Preinvestment Phase

Mzimba Sub-project
(MK)

	Unit Cost	Grade	Year 1 (1976/77)	Year 2 (1977/78)	Total	F. Exch. %	F. Exch. Total
A. CAPITAL COSTS							
4-wheel drive - ext. and training	7,880		7,880	--	7,880	90	7,092
4-wheel drive - land husbandry	7,880		--	7,880	7,880	90	7,092
Motorcycle - ext. and training	600		--	(2) 1,200	1,200	90	1,080
Motorcycle - research	600		--	600	600	90	540
Office equipment - ext. and training			--	1,000	1,000	75	750
Office equipment - land husbandry			1,000	--	1,000	75	750
Office equipment - research			1,000	--	1,000	75	750
Survey equipment - land husbandry			--	1,600	1,600	90	1,440
Tentage - land husbandry			--	1,000	1,000	90	900
Total A			9,880	13,280	23,160	88	20,394
B. OPERATING COSTS							
(a) Salaries and Wages:							
Senior Technical Officer - ext. and training	2,500	STO	1,250 ^{1/}	2,500	3,750	--	--
Extension Officer - ext. and training	1,500	TO	--	1,500	1,500	--	--
Credit Officer - ext. and training	1,500	TO	--	1,500	1,500	--	--
Technical Assistant - ext. and training	600	TA	--	(7) 4,200	4,200	--	--
Credit Assistant - ext. and training	600	TA	--	(2) 1,200	1,200	--	--
Technical Officer - land husbandry	1,500	TO	--	1,500	1,500	--	--
Technical Assistant - land husbandry	600	TA	--	(4) 2,400	2,400	--	--
Labourer - land husbandry	80		--	(8) 640	640	--	--
Technical Officer - research	1,500	TO	--	1,500	1,500	--	--
Technical Assistant - research	600	TA	--	600	600	--	--
Labourer - research	80		--	(8) 640	640	--	--
Subtotal (a)			1,250	18,180	19,430	--	--
(b) Other Operating Costs:							
4-wheel drive 15,000 m/yr at 21t	3,150		3,150	(2) 6,300	9,450	90	8,505
Motorcycle 10,000 m/yr at 4t	400		--	(3) 1,200	1,200	90	1,080
Office materials - ext. and training			--	1,000	1,000	75	750
Office materials - land husbandry			--	500	500	75	375
Office materials - research			--	500	500	75	375
Borehole maintenance	40		--	(10) 400	400	30	120
Building maintenance 2 1/2% p.a.			--	3,084	3,084	30	925
Fertilizer and seed trials			--	250	250	75	188
Subtotal (b)			3,150	13,234	16,384	75	12,318
Total B			4,400	31,414	35,814	34	12,318
C. CIVIL WORKS							
Staff houses							
Type A - ext. and training	24,700		24,700	--	24,700	30	7,410
Type B - ext. and training	10,200		(2) 20,400	--	20,400	30	6,120
Type B - land husbandry	10,200		10,200	--	10,200	30	3,060
Type B - research	10,200		10,200	--	10,200	30	3,060
Type D - ext. and training	2,800		(9) 25,200	--	25,200	30	7,560
Type D - land husbandry	2,800		(4) 11,200	--	11,200	30	3,360
Type D - research	2,800		2,800	--	2,800	30	840
Rural training center	4,500		4,500	--	4,500	30	1,350
Offices - headquarter ext. and training	12/sq.ft.		(780) 9,360	--	9,360	30	2,808
Offices - land husbandry	12/sq.ft.		(200) 2,400	--	2,400	30	720
Offices - research	12/sq.ft.		(200) 2,400	--	2,400	30	720
Borehole	2,500		(10) 25,000	(10) 25,000	50,000	30	15,000
Bridge - Chakazi			--	70,000	70,000	30	21,000
Bridge - Luwewa			--	20,000	20,000	30	6,000
Total C			148,360	115,000	263,360	30	79,008
D. CREDIT FUND							
Credit for inputs			--	70,000	70,000	85	59,500
Grand Total (A,B,C)			162,640	229,694	392,334	44	171,220

^{1/} 6 months in Year I only.

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MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

NRDP - Preinvestment Phase

Thiwi/Lifidzi Sub-project
(MK)

	Unit Cost	Grade	Year 1 (1976/77)	Year 2 (1977/78)	Total	F. Exch. Z	F. Exch. Total
A. CAPITAL COSTS							
4-wheel drive - extension and training	7,880		7,880	--	7,880	90	7,092
Motorcycle - extension and training	600		--	(5) 3,000	3,000	90	2,700
Motorcycle - research	600		--	600	600	90	540
Motorcycle - forestry	600		--	600	600	90	540
Lorry - 5-ton flat - forestry	12,650		12,650	--	12,650	90	11,385
Equipment - forestry			--	200	200	90	180
Office equipment - ext. and training			1,000	--	1,000	75	750
Total A			21,530	4,400	25,930	89	23,187
B. OPERATING COSTS							
(a) Salaries and Wages:							
Senior Technical Officer - ext. and training	2,500	STO	2,500	2,500	5,000	--	--
Land Husbandry Specialist - ext. and training	1,500	TO	--	1,500	1,500	--	--
Tobacco Specialist - ext. and training	1,500	TO	--	1,500	1,500	--	--
Credit Specialist - ext. and training	1,500	TO	--	1,500	1,500	--	--
Area Supervisor - ext. and training	1,500	TO	--	(2) 3,000	3,000	--	--
Technical Assistant - ext. and training	600	TA	--	(20) 12,000	12,000	--	--
Clerical Officer - ext. and training	600	CO	600	600	1,200	--	--
Typist - ext. and training	600	DS	--	600	600	--	--
FHI - ext. and training	600	TA	--	(2) 1,200	1,200	--	--
Messenger/Workman - ext. and training	170		(2) 340	(5) 850	1,190	--	--
Technical Assistant - research	600	TA	--	600	600	--	--
Labourer - research	80		--	(8) 640	640	--	--
Forest Ranger	600	TA	--	600	600	--	--
Nurseryman - forestry			--	505	505	--	--
Labourer - forestry	80		--	80	80	--	--
Subtotal (a)			3,440	27,675	31,115	--	--
(b) Other Operating Costs:							
4-wheel drive 15,000 m/yr at 21t	3,150		3,150	3,150	6,300	90	5,670
Motorcycle 10,000 m/yr at 4t	400		--	(7) 2,800	2,800	90	2,520
Office materials			200	200	400	75	300
Miscellaneous equipment - research			100	100	200	90	180
Fertilizer and seed trials - research			100	100	200	75	150
Fertilizer, chemicals and seed - forestry			--	1,500	1,500	75	1,125
Lorry - 4,000 m/yr at 34t	1,360		1,360	1,360	2,720	90	2,448
Nursery maintenance, etc. - forestry			300	300	600	90	540
Borehole maintenance	40		--	(16) 640	640	30	192
Building maintenance 2 1/2% p.a.			--	3,772	3,772	30	1,162
Subtotal (b)			5,210	13,922	19,132	75	14,287
Total B			8,650	41,597	50,247	28	14,287
C. CIVIL WORKS							
Staff houses							
Type B - ext. and training	9,100		(6) 54,600	--	54,600	30	16,380
Type D - ext. and training	2,500		(24) 60,000	--	60,000	30	18,000
Type D - research	2,500		2,500	--	2,500	30	750
Type D - forestry	2,500		(2) 5,000	--	5,000	30	1,500
Rural training center	4,500		(2) 9,000	--	9,000	30	2,700
Offices - headquarter ext. and training	12/sq. ft.		(880) 10,560	--	10,560	30	3,168
Offices - field ext. and training	12/sq. ft.		(3x200) 7,200	--	7,200	30	2,160
Materials store - forestry			2,000	--	2,000	20	600
Borehole - ext. and training	2,500		(15) 37,500	--	37,500	30	11,250
Borehole and reticulation - Forestry	3,500		3,500	--	3,500	30	1,050
Road construction	1,500/mi.		--	(50) 75,000	75,000	30	22,500
Total C			191,860	75,000	266,860	30	80,058
D. CREDIT FUND							
Credit for inputs			--	20,000	20,000	85	17,000
Grand Total (A,B,C,D)			222,040	140,997	363,037	37	134,532

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ANNEX 8
Table 20

MALAWI
KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

NRDP - Preinvestment Phase

Kawinga Sub-Project
(MK)

	<u>Unit</u> <u>Cost</u>	<u>Grade</u>	<u>Year 1</u> <u>(1976/77)</u>	<u>Year 2</u> <u>(1977/78)</u>	<u>Total</u>	<u>F. Exch.</u> <u>%</u>	<u>F. Exch.</u> <u>Total</u>
A. CAPITAL COSTS							
4-wheel drive - extension and training	7,880		--	(2) 15,760	15,760	90	14,184
Motorcycle - research	600		--	600	600	90	540
Total A				<u>16,360</u>	<u>16,360</u>	<u>90</u>	<u>14,724</u>
B. OPERATING COSTS							
(a) Salaries and Wages:							
Chief Technical Officer - extension and training	3,300	CTO	--	3,300	3,300	--	--
Technical Officer - research	1,500	TO	--	1,500	1,500	--	--
Labourer - research	80		--	(7) 560	560	--	--
Subtotal (a)			--	5,360	5,360	--	--
(b) Other Operating Costs:							
4-wheel drive 15,000 m/yr @ 2lt	3,150		--	3,150	3,150	90	2,835
Motorcycle 10,000 m/yr at 4t	400		--	400	400	90	360
Stationery and office supplies - ext. and Training	500		--	500	500	75	375
Tools, materials, inputs, etc., - research	250		--	250	250	75	188
Subtotal (b)			--	4,300	4,300	87	3,758
Total B			--	<u>9,660</u>	<u>9,660</u>	<u>39</u>	<u>3,758</u>
C. CIVIL WORKS							
Staff houses							
Type A - extension and training	22,000		--	22,000	22,000	30	6,600
Type B - extension and training	9,100		--	(4) 36,400	36,400	30	10,920
Type C - land husb. and research	9,100		--	9,100	9,100	30	2,730
Type D - extension and training	2,500		--	(17) 42,500	42,500	30	12,750
Type D - land husb. and research	2,500		--	(5) 12,500	12,500	30	3,750
Rural training center	4,500		--	(2) 9,000	9,000	30	2,700
Offices	12/sq.ft.		--	(1220) 14,640	14,640	30	4,392
Borehole	2,500		--	(10) 25,000	25,000	30	7,500
Total C			--	<u>171,140</u>	<u>171,140</u>	<u>30</u>	<u>51,342</u>
Grand Total (A,B,C)			--	<u>197,160</u>	<u>197,160</u>	<u>35</u>	<u>69,824</u>

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MALAWI
KARONGA RURAL DEVELOPMENT PROJECT - PHASE II
NRDP - Preinvestment Phase
Markets and Input Stores (ADMARC)
(MK)

	<u>Unit</u> <u>Cost</u>	<u>Year 1</u> <u>(1976/77)</u>	<u>Year 2</u> <u>(1977/78)</u>	<u>Total</u>	<u>F. Exch.</u> <u>%</u>	<u>F. Exch.</u> <u>Total</u>
(a) <u>Kawinga Sub-project</u>						
Market - Ntaja	20,000	--	20,000	20,000	30	6,000
Input store - Ngokwe, Mwitiya	10,000	--	(2) 20,000	20,000	30	6,000
Total (a)		--	40,000	40,000	30	12,000
(b) <u>Thiwi/Lifidzi Sub-project</u>						
Input store	10,000	(2) 20,000	(1) 10,000	30,000	30	9,000
(c) <u>Mzimba Sub-project</u>						
Bush market /input store	10,000	10,000	10,000	20,000	30	6,000
Grand Total (a,b,c)		30,000	60,000	90,000	30	27,000

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MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

NRDP - Preinvestment Phase

Health

(MK)

	<u>Unit Cost</u>	<u>Grade</u>	<u>Year 1 (1976/77)</u>	<u>Year 2 (1977/78)</u>	<u>Total</u>	<u>F. Exch. %</u>	<u>F. Exch. Total</u>
(a) <u>Kawinga Sub-project</u>			--	--	--	--	--
(b) <u>Thiwi/Lifidzi Sub-project</u>			--	--	--	--	--
(c) <u>Mzimba Sub-project</u>			--	--	--	--	--
<u>A. CAPITAL COSTS</u>							
Equipment (maternity unit)			<u>2,800</u>	<u>--</u>	<u>2,800</u>	<u>90</u>	<u>2,520</u>
<u>B. OPERATING COSTS</u>							
(a) Salaries and Wages:							
Hospital Assistant	600		600	600	1,200	--	--
Enrolled Nurse/Midwife	480		<u>480</u>	<u>480</u>	<u>960</u>	--	--
Subtotal (a)			1,080	1,080	2,160	--	--
(b) Other Operating Costs:							
Drugs			600	600	1,200	75	900
Borehole maintenance	40		--	40	40	30	12
Building maintenance 2 1/2% p.a.			--	<u>903</u>	<u>903</u>	<u>30</u>	<u>271</u>
Subtotal (b)			600	1,543	2,143	44	1,183
Total B (a+b)			<u>1,680</u>	<u>2,623</u>	<u>4,303</u>	<u>27</u>	<u>1,183</u>
<u>C. CIVIL WORKS</u>							
Maternity ward			20,000	--	20,000	30	6,000
Demonstration kitchen			10,500	--	10,500	30	3,150
Staff houses - type D	2,800		(2) 5,600	--	5,600	30	1,680
Borehole	2,500		<u>2,500</u>	<u>--</u>	<u>2,500</u>	<u>30</u>	<u>750</u>
Total C			<u>38,600</u>	<u>--</u>	<u>38,600</u>	<u>30</u>	<u>11,580</u>
Total c			<u>43,080</u>	<u>2,623</u>	<u>45,703</u>	<u>33</u>	<u>15,039</u>
Grand Total (a,b,c)			<u>43,080</u>	<u>2,623</u>	<u>45,703</u>	<u>33</u>	<u>15,039</u>

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MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Summary of Phase I related Recurrent Cost Items to be born by Borrower 1/
(MK)

	Unit Cost	Grade	Year 1 (1976/77)	Year 2 (1977/78)	Year 3 (1978/79)	Year 4 (1979/80)	Total	Foreign Exchange %	Foreign Exchange Total
<u>Extension</u>									
Senior Field Officer	2,500	STO	-	-	-	2,500	2,500	-	-
Field Officer	1,500	TO	-	1,500	(4) 4,500	(5) 7,500	13,500	-	-
Senior Field Assistant	1,300	STA	-	1,300	(3) 3,900	(5) 6,500	11,700	-	-
Field Assistant	600	TA	-	(3) 1,800	(6) 3,600	(10) 6,000	11,400	-	-
Farm Home Instructress	600	TA	-	600	(2) 1,200	(3) 1,800	3,600	-	-
Development Assistant	360	DA	-	(5) 1,800	(6) 2,160	(10) 3,600	7,560	-	-
sub-total			-	7,000	15,360	27,900	50,260	-	-
<u>Land Husbandry</u>									
Field Officer	1,500	TO	-	-	-	1,500	1,500	-	-
<u>Livestock</u>									
Field Officer	1,500	TO	-	-	-	1,500	1,500	-	-
Veterinary and/or Field Assistant	600	TA	-	(2) 1,200	(4) 2,400	(7) 4,200	7,800	-	-
Development Assistant	360	DA	-	-	-	360	360	-	-
Operating - water supplies & pumps	-	-	-	-	(25%) 275	(50%) 550	825	50	413
Operating - dipping fluid	-	-	-	-	(25%) 720	(50%) 1,440	2,160	90	1,944
sub-total			-	1,200	3,395	8,050	12,645	18	2,357
<u>Construction</u>									
Maintenance Lufira Scheme	-	-	-	-	10,000	10,000	20,000	-	-
<u>Mechanical Maintenance</u>									
Clerical Officer	600	CO	-	-	-	600	600	-	-
Chargehand	800	TA	-	-	-	800	800	-	-
Operating - generators	-	-	-	-	(25%) 5,380	(50%) 10,760	16,140	90	14,526
sub-total			-	-	5,380	12,160	17,540	82	14,526
<u>Finance</u>									
Senior Executive Officer	2,500	SEO	-	-	2,500	2,500	5,000	-	-
Credit Officer	1,500	TO	-	-	-	1,500	1,500	-	-
Executive Officer	1,500	EO	-	-	1,500	(2) 3,000	4,500	-	-
Senior Clerical Officer	1,300	SCO	-	-	1,300	(2) 2,600	3,900	-	-
Credit Assistant	600	TA	-	-	-	(2) 1,200	1,200	-	-
Clerical Officer/Accounts Assistant	600	CO	-	-	600	(3) 1,800	2,400	-	-
Copy Typist	600	D5	-	-	600	(2) 1,200	1,800	-	-
sub-total			-	-	6,500	13,800	20,300	-	-
<u>Project Managers Office</u>									
Assistant Project Manager	88	4,450	-	-	-	4,450	4,450	-	-
Executive Officer	1,500	EO	-	-	-	1,500	1,500	-	-
Clerical Officer	600	CO	-	600	(2) 1,200	(2) 1,200	3,000	-	-
Development Assistant	360	DA	-	360	(2) 720	(3) 1,080	2,160	-	-
Telephone Operator	600	CO	-	-	600	600	1,200	-	-
sub-total			-	960	2,520	8,830	12,310	-	-
TOTAL			-	9,160	43,155	82,240	134,555	12	16,883

1/ In addition to pre-Phase I staff already paid for by MANR (see also Annex 8, Appendix 2).

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KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Financing of Agricultural Staff in Karonga and Chitipa Districts

	Year 1 (1976/77)		Year 2 (1977/78)		Year 3 (1978/79)		Year 4 (1979/80)	
	MANR 1/	KRDP	MANR	KRDP	MANR	KRDP	MANR	KRDP
Extension								
S9	-	1	-	1	-	1	-	1
CTO	-	2	-	2	-	2	-	2
STO	3	2	3	2	3	2	4	1
TO	6	8	7	9	8	8	11	6
STA	2	7	3	7	5	5	7	3
TA	35	18	38	22	41	24	45	24
TA FHI	4	4	5	3	6	2	7	1
DA	30	14	33	15	36	15	40	14
SCO	-	1	-	1	-	1	-	1
CO	-	2	-	2	-	2	-	2
Land Husbandry								
PO	-	1	-	1	-	1	-	-
TO	-	2	-	2	-	2	1	1
STA	-	1	-	1	-	1	-	-
TA	2	8	2	8	2	4	-	-
Livestock								
S9	-	1	-	1	-	1	-	1
TO	2	2	2	2	2	2	3	1
TA including Lufira	25	12	27	10	29	8	32	5
CO	1	1	1	1	1	1	1	1
DA	4	5	4	5	4	5	5	4
Construction Unit^{2/}								
CTO	-	1	-	1	-	1	-	1
STO	-	1	-	1	-	1	-	1
STO Lufira	-	1	1	-	1	-	1	-
TO	-	1	-	1	-	1	-	1
STA	-	1	-	1	-	1	-	1
TA Lufira	-	2	2	-	2	-	2	-
TA	-	5	-	5	-	5	-	5
CO	-	2	-	2	-	2	-	2
DA	-	10	-	10	-	10	-	10
Research								
PO	-	1	-	1	-	1	-	1
STO	-	1	-	1	-	1	-	1
TO	1	2	1	2	1	2	1	2
TA	3	2	3	4	3	6	3	6
DA	1	2	1	4	1	4	1	4
CO	-	1	-	1	-	1	-	1
Hydrology								
PO	-	1	-	1	-	1	-	1
TO	1	1	1	1	1	1	1	1
TA	-	3	-	3	-	3	-	3
DA	2	8	2	8	2	8	2	8
Mech. Maintenance								
CTO	-	1	-	1	-	1	-	1
TO	-	1	-	1	-	1	-	1
CO	-	2	-	2	-	2	1	1
TA	-	2	-	2	-	2	1	1
Finance								
S9	-	1	-	1	-	1	-	1
PO/CTO	-	1	-	1	-	1	-	1
SEO	-	2	-	2	1	1	1	1
EO	-	3	-	3	1	2	2	1
TO	-	2	-	2	-	2	1	1
SCO	-	4	-	4	1	3	2	2
STA	-	1	-	1	-	1	-	1
TA - Karonga credit	-	2	-	5	-	9	2	10
TA - Chitipa credit	-	4	-	5	-	8	-	8
DA	-	10	-	7	-	3	-	-
CO - Clerical	1	3	1	3	2	2	3	1
CO - Accounts Ass.	-	2	-	2	-	2	1	1
D5	-	3	-	3	1	2	2	1
Evaluation								
PO	-	1	-	1	-	1	-	1
TO	-	3	-	3	-	3	-	3
TA	-	4	-	4	-	2	-	2
DA	-	18	-	18	-	12	-	12
CO	-	1	-	1	-	1	-	1
Management Unit								
PM	-	1	-	1	-	1	-	1
Ass. PM	-	1	-	1	-	1	1	-
SEO	-	1	-	1	-	1	-	1
EO	-	1	-	1	-	1	1	-
SCO	-	1	-	1	-	1	-	1
CO	-	4	1	3	2	2	2	2
DA	-	5	1	4	2	3	3	2
D1	-	1	-	1	-	1	-	1
D5	-	1	-	1	-	1	-	1
CO - Telephone	-	2	-	2	1	1	1	1

1/ Existing staff already paid for by MANR

2/ Does not cover senior staff in other irrigation schemes

March 2, 1976

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Housing Construction Program
(MK)

Division	Year 1 (1976/77)	Housing Numbers & Types ^{1/}		Year 2 (1977/78)	Housing Numbers & Types		Year 3 (1978/79)	Housing Numbers & Types		Year 4 (1979/80)	Housing Numbers & Types		Total	% of Total
Extension/Land Husbandry	56,000 (2) A 81,200 (7) B 58,500 (9) C 35,200 (11) D			22,400 (7) D			-			3,200 (1) D			81,600 81,200 58,500 35,200	43
Livestock	11,600 (1) B 19,200 (6) D			-			-			-			11,600 19,200	5
Construction	11,600 (1) B 6,500 (1) C 19,200 (6) D			-			-			-			11,600 6,500 19,200	6
Research	28,000 (1) A 11,600 (1) B 9,600 (3) D			6,400 (2) D			6,400 (2) D			-			40,800 11,600 9,600	10
Hydrology	9,600 (3) D			-			-			-			9,600	2
Mechanical Maintenance	11,600 (1) B 12,800 (4) D			-			-			-			11,600 12,800	4
Finance	28,000 (1) A 46,400 (4) B 19,500 (3) C 16,000 (5) D			6,500 (1) C 9,600 (3) D			- 16,000 (5) D			- 9,600 (3) D			34,500 81,600 19,500 16,000	24
Evaluation	23,200 (2) P 12,800 (4) D			-			-			-			23,200 12,800	6
Subtotal	528,100			44,900			22,400			12,800			608,200	100
less existing housing ^{2/}														
A (1) 28,000														
B (4) 46,400														
C (1) 6,500														
D (19) 60,800	141,700			-			-			-			141,700	
Total	386,400			44,900			22,400			12,800			466,500	
Phasing of construction ^{3/}	151,234			151,233			151,233			12,800			466,500 ^{4/}	

- 1/ Type A (Corresponding MOW classification CH 10 and CL 6) - staff grade entitlement: S5, PO, CTO, CEO - Unit Cost MK 28,000
 " B (Corresponding MOW classification DH 8 and DL 3) - staff grade entitlement: EO, TO, SEO, STO - Unit cost MK 11,600
 " C (Corresponding MOW classification EH 5 and EL 2A) - staff grade entitlement: SCO, STA - Unit cost MK 6,500
 " D (Corresponding MOW classification FH 2 and PL 1) - staff grade entitlement: TA, CO, DL, D2, D5, D6 - Unit cost MK 3,200

2/ Houses presently under construction and expected to be completed by the end of Phase I; houses not yet occupied or to become available through reassignment of staff.

3/ Since the housing requirements in Year 1 exceed Project's construction capacity, the first 3 years requirements have been equally phased over 3 years. No difficulties are foreseen in accommodating staff in the interim.

4/ Total numbers of houses to be constructed: 3 x type A
 13 x type B
 13 x type C
 46 x type D

March 2, 1976

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Construction Costs of Staff Housing

Staff Grades	Proposed Type	<u>MOW Houses (Lilongwe)</u>			<u>LLDP Houses (Lilongwe)</u>			1976 Unit Cost Estimates (MK) (Based on LLDP Data)		
		Design Number	Approximate Floor Space (sq ft)	Unit Cost 1/ (MK)	Approximate Floor Space (sq ft)	Unit Cost 1975 2/ (MK)	Unit Cost 1976 3/ (MK)	Karonga Chitipa 4/	Mzimba 5/	Thiwi-Lifidzi Kawinga 6/
TA/CO/D1/D2/D5/D6	D	PH ₂	275	3,480	420	1,650	2,000	3,200	2,800	2,500
SCO/STA	C	EH ₅	N.A.	5,140	N.A.	3,400	4,100	6,500	5,800	5,200
EO/TO/SEO/STO	B	DH ₈	795	13,520	800	6,040	7,250	11,600	10,200	9,100
S/PO/CTO/CEO	A	CH ₁₀	1,220	19,710	1,420	14,684	17,600	28,000	24,700	22,000

1/ Anticipated Costs, April 1976

2/ Actual Costs, including overheads, October 1975

3/ 1975 Actual Costs plus 20%

4/ 160% of Lilongwe estimates

5/ 140% of Lilongwe estimates

6/ 125% of Lilongwe estimates

March 2, 1976

MALAWIKARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Estimated Schedule of Disbursements
(US\$ '000)

<u>IBRD Fiscal Year and Quarter</u>	<u>Quarterly Disbursements</u>	<u>Cumulative Disbursements</u>
<u>1976/77</u>		
September 30, 1976	-	-
December 31, 1976	-	-
March 31, 1977	-	-
June 30, 1977	800	800
<u>1977/78</u>		
September 30, 1977	800	1,600
December 31, 1977	800	2,400
March 31, 1978	800	3,200
June 30, 1978	800	4,000
<u>1978/79</u>		
September 30, 1978	900	4,900
December 31, 1978	1,100	6,000
March 31, 1979	1,100	7,100
June 30, 1979	300	7,400
<u>1979/80</u>		
September 30, 1979	300	7,700
December 31, 1979	300	8,000
March 31, 1980	400	8,400
June 30, 1980	200	8,600
<u>1980/81</u>		
September 30, 1980	200	8,800
December 31, 1980	200	9,000
March 31, 1981	200	9,200

May 21, 1976

MALAWI
KAROMA RURAL DEVELOPMENT PROJECT - PHASE II
Government Cash Flow for Phase II
(K '000)

	Year 1 (1976/77)	Year 2 (1977/78)	Year 3 (1978/79)	Year 4 (1979/80)	Year 5 (1980/81)	Year 6 (1981/82)	Year 7 (1982/83)	Year 8 (1983/84)	Year 9 (1984/85)	Year 10 (1985/86)	Year 11 (1986/87)	Year 12 (1987/88)	Year 13 (1988/89)	Year 14 (1989/90)	Year 15 (1990/91)	Year 16 (1991/92)	Year 17 (1992/93)	Year 18 (1993/94)	Year 19 (1994/95)	Year 20 (1995/96)
CASH INFLOW																				
IMRD Loan Disbursement 1/	1,200	3,200	2,600	950	350	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
ADMARC Profit 2/	43	88	136	187	230	261	294	327	353	355	355	355	355	355	355	355	355	355	355	355
Credit Fund 3/	--	--	--	--	25	39	10	6	11	39	32	32	32	32	32	32	32	32	32	32
Lake Transport 4/	11	12	22	24	27	28	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Total Cash Inflow	1,254	3,300	2,758	1,161	632	328	334	363	394	424	417	417	417	417	417	417	417	417	417	417
CASH OUTFLOW																				
IMRD Loan Service - Capital	--	--	--	--	--	--	--	283	297	315	328	346	360	378	402	425	437	459	590	504
IMRD Loan Service - Interest	--	--	--	--	--	--	--	398	384	370	354	338	357	303	285	265	245	223	201	177
IMRD Loan Service - Commitment Charge	--	--	--	--	--	--	--	135	--	--	--	--	--	--	--	--	--	--	--	--
Phase II Project Cost - KRD	1,888	1,872	1,575	941	706	706	706	706	706	706	706	706	706	706	706	706	706	706	706	706
Phase II Project Cost - KRD	1,204	1,649	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Phase II Project Cost - Lake Transport	534	1,545	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63	63
Fixed Asset Replacement - KRD	--	--	--	--	138	138	138	138	138	138	138	138	138	138	138	138	138	138	138	138
Fixed Asset Replacement - Lake Transport	--	--	--	--	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30	30
Total Cash Outflow	3,436	5,066	1,638	1,004	937	937	937	1,753	1,618	1,622	1,619	1,621	1,654	1,618	1,623	1,667	1,619	1,619	1,878	1,618
Net Cash Inflow (Outflow)	(2,182)	(1,766)	1,120	157	(305)	(609)	(603)	(1,390)	(1,224)	(1,198)	(1,202)	(1,204)	(1,237)	(1,201)	(1,206)	(1,250)	(1,202)	(1,202)	(1,261)	(1,201)
Cumulative Cash Inflow (Outflow)	(2,182)	(3,948)	(2,828)	(2,671)	(2,976)	(3,585)	(4,188)	(5,578)	(6,802)	(8,000)	(9,202)	(10,406)	(11,643)	(12,844)	(14,050)	(15,300)	(16,502)	(17,704)	(18,965)	(20,166)

1/ Based on disbursement schedule (Annex 9).

2/ ADMARC's profits are assumed to be benefits to the Government for this purpose and have been calculated on basis of actual average profit on crop purchases of the last five years; they relate to the incremental marketable production of Phase II only.

3/ Surplus of credit operations.

4/ Income generated through Lake Transport improvement.

May 14, 1976

MALAWIKARONGA RURAL DEVELOPMENT PROJECT - PHASE IIFarm BudgetsGeneral

1. As in other parts of Malawi, farm sizes do not vary widely in Karonga and Chitipa districts, and generally there exists a close relationship between the number of persons in the family and the area cultivated by the household. The 1968/69 National Sample Survey of Agriculture disclosed that about two thirds of all households cultivate between two and six acres and that the combined area of these farms equals about two thirds of all cultivated land in the two districts. On the basis of recent aerial photography it is estimated that the cultivated area per household is on average about 3.7 acres in Karonga and 3.9 acres in Chitipa. The cultivated areas tend to be somewhat smaller in the rice growing areas in northern Karonga and in certain parts of the Chitipa plains, whilst they are slightly above average in the less intensively cultivated parts of southern Karonga and Misuku hills in northern Chitipa. To illustrate the Project's impact on farmers' incomes, budgets have been worked out for typical 4-acre farms located respectively in the rice areas of Karonga and the dryland crop areas of Karonga and Chitipa. If a farmer switches from hand cultivation techniques to work-oxen for land preparation, and possibly for transport, it may be expected that the cultivated area would rise to about eight acres in Chitipa for which a separate budget has been prepared.

Values and Costs of Crop Production

2. On the basis of projected yields and input requirements (see Annex 1) estimates have been made of the value of production, the production costs and the margins, both per acre and per man-day, for all main crops with and without the proposed improvements (Tables 1 and 2). Selecting appropriate prices proved to be particularly difficult for the Karonga and Chitipa districts because of frequent sales of crops outside the official ADMARC channels. There exists no information on the volumes involved and the prices but it is known that both fluctuate heavily from year to year. For example ADMARC hardly bought any groundnuts in Karonga in 1974 and 1975 since the prices farmers were able to obtain through border trade were at least double those of ADMARC's guaranteed minimum prices. Maize was reported to be sold in 1975 at prices which exceeded the official prices by up to 50%. In preparing the farm budgets two different series of prices have been used. The first set represents the official 1976 ADMARC prices for crops and for fertilizers, as announced in September 1975. The second series have been derived from the farmgate values for 1980 (in 1976 constant prices) which were used in

the economic evaluation of the Project. The economic farmgate values for crops were reduced by about 15% which is assumed to reflect a reasonable profit margin for the marketing organization.

3. Table 1 demonstrates that rice is clearly the most profitable crop in Karonga, both in terms of margin per acre and margin per labour day. Under improved rainfed conditions the net return per acre would increase by about one third and the return per man-day by about 15%. The table also illustrates that the net return per man-day would be lower for irrigated rice than for improved rainfed rice. Since rice is grown in distinct areas, there does not exist an actual or potential competition with other crops.

4. The profitability of the various dryland crops depends entirely on the prices one chooses. On the basis of the increased 1976 ADMARC prices, maize seems to be the most profitable dryland crop in terms of returns per man-day, both in Karonga and Chitipa (Tables 1 and 2). Improved cotton, however, shows a higher margin per acre and would also give the highest return per man-day if by 1980 the price would reflect the economic farmgate value. There also seems to be room for a substantial raise in groundnut prices in view of its projected economic value. This would make the crop more attractive than on the basis of ADMARC prices, although still less profitable than on the basis of the prices farmers were able to obtain in 1975. As might be expected, ox-cultivation increases the margins per day for maize and groundnuts by some 10 - 15% but the margin per acre decreases by about the same proportion because of the higher costs involved.

5. The following summarizes the margins per acre and per man-day for the main crops under improved conditions, using the two sets of prices, discussed above, as well as the approximate prices which farmers could obtain in late 1975 by selling outside the official channels. The benefit/cost ratios associated with both the total and the incremental production, are shown as well.

	Hand-Cultivation			Oxen-Cultivation		
	Rainfed Rice (Karonga)	Syn- thetic Maize (Chitipa)	Chalim- bana Ground- nuts (Karonga)	Cotton (Karonga)	Syn- thetic Maize (Chitipa)	Mani- pintar Ground- nut (Chitipa)
Margin per Acre (MK)						
1976 ADMARC prices	91.25	33.60	26.65	42.85	28.60	21.15
Projected 1980 prices	90.75	30.30	33.95	66.45	25.30	27.10
Estimated unoffic- ial 1975 prices	91.25	40.00	50.00	42.85	35.00	45.00
Margin per Day (MK)						
1976 ADMARC prices	1.30	0.67	0.31	0.48	0.84	0.42
Projected 1980 prices	1.30	0.61	0.40	0.74	0.74	0.54
Estimated unoffic- ial 1975 prices	1.30	0.80	0.59	0.48	1.02	0.90
Benefit/Cost ratios						
(a) for Total Production						
- 1976 ADMARC prices	6.4/1	2.6/1	3.9/1	3.0/1	2.1/1	2.7/1
- Projected 1980 prices	6.3/1	2.3/1	4.1/1	4.2/1	1.9/1	2.9/1
(b) for Incremental Production only						
- 1976 ADMARC prices	3.0/1	2.0/1	4.8/1	2.0/1	<u>1/</u>	<u>1/</u>
- Projected 1980 prices	2.9/1	1.7/1	4.8/1	2.8/1	<u>1/</u>	<u>1/</u>

1/ Same as for total production.

Farm Budgets

6. The per acre estimates have subsequently been used to compute budgets for typical farms (Tables 3, 4 and 5). Because of a lack of sufficient information no attempt has been made to prepare a budget for the Misuku hills area in Chitipa district. The assumed cropping patterns in the without Project case reflect the average for the areas concerned. There is no reason to believe that the standards of crop husbandry and the readiness to adopt modern inputs vary with the size of the farms and therefore a linear relationship between farm size and farm income may be assumed.

7. A summary of the net values of crop production without and with the Project and using the two different sets of prices mentioned earlier, is given below:

	<u>Rainfed Rice Karonga (4 ac)</u>	<u>Dryland Crops Karonga (4 ac)</u>	<u>Dryland Crops Chitipa (4 ac)</u>	<u>Ox- Cultivated Chitipa (8 ac)</u>
<u>At 1976 ADMARC Prices</u>				
With Project (MK)	214.00	114.60	98.60	187.60
Without Project (MK)	<u>166.10</u>	<u>63.90</u>	<u>71.60</u>	<u>71.60</u> 1/
Increment (MK)	47.90	50.70	27.00	116.00
Increment (%)	28	79	38	162
<u>At 1980 Projected Prices</u>				
With Project (MK)	213.00	144.05	96.15	189.25
Without Project (MK)	<u>166.10</u>	<u>67.65</u>	<u>74.60</u>	<u>74.60</u> 1/
Increment (MK)	46.90	76.40	21.55	144.65
Increment (%)	28	113	29	154

1/ Without Project: 4 acres, hand cultivated.

February 15, 1976

MALAWI
KARONGA RURAL DEVELOPMENT PROJECT, PHASE II

Crop Margins per Acre and per Man-Day, Karonga District

	Rice			Maize		Groundnuts		Cotton		Cassava
	Unimproved Rainfed	Improved Rainfed	Irrigated	Unimproved Local	Composite or Synthetic	Unimproved (Malimba)	Improved (Chalimbana)	Unimproved	Improved	Unimproved
<u>Margins at Official 1976 Prices^{1/}</u>										
Production										
- Yield, lb/ac	1,600	2,400	3,000	800	2,200	300	450	300	800	1,800
- Value, MK/ac	72.00	108.00	135.00	18.00	49.50	21.00	36.00	24.00	64.00	18.00
Costs, MK/ac										
- Seed ^{2/}	2.70	3.00	3.00	0.50	0.70	4.20	6.95	--	--	--
- Fertilizer ^{3/}	-	10.05	20.10	-	15.70	-	-	-	-	-
- Insecticides ^{4/}	-	-	-	-	-	-	-	-	12.00	-
- Tools, etc. ^{5/}	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	7.00	2.00
- Credit charge	-	1.70	2.95	-	2.00	-	0.40	-	2.15	-
Total	4.70	16.75	28.05	2.50	20.40	6.20	9.35	2.00	21.15	2.00
Margin, MK/ac	67.30	91.25	106.95	15.50	29.10	14.80	26.65	22.00	42.85	16.00
Number of labour days	60	70	85	40	50	65	85	70	90	40
Margin, MK/day	1.12	1.30	1.26	0.39	0.58	0.23	0.31	0.31	0.48	0.40
<u>Margins at Projected 1980 Prices^{1/}</u>										
Value of Production, MK/ac	72.00	108.00	135.00	18.00	49.50	27.00	45.00	33.00	88.00	18.00
Costs, MK/ac										
- Seed ^{2/}	2.70	3.00	3.00	0.50	0.70	5.40	8.55	-	-	-
- Fertilizer ^{3/}	-	10.50	21.00	-	16.60	-	--	-	-	-
- Insecticides ^{4/}	-	-	-	-	-	-	-	-	12.00	-
- Tools, etc. ^{5/}	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	7.00	2.00
- Credit charge	-	1.75	3.35	-	2.55	-	0.50	-	2.55	-
Total	4.70	17.25	29.35	2.50	21.85	7.40	11.05	2.00	21.55	2.00
Margin, MK/ac	67.30	90.75	105.65	15.50	27.65	19.60	33.95	31.00	66.45	16.00
Margin, MK/day	1.12	1.30	1.24	0.39	0.55	0.30	0.40	0.44	0.74	0.40

1/ Price assumptions:

	1976	1980
Paddy, t/lb	4.50	4.50
Maize, t/lb	2.25	2.25
Groundnuts, Malimba, t/lb	7.00	9.00
Groundnuts, Chalimbana, t/lb	8.00	10.00
Cotton, t/lb	8.00	11.00
Cassava, t/lb	1.00	1.00
Improved rice seed, t/lb	6.00	6.00
Composite or synthetic maize seed, t/lb	5.00	5.00
Chalimbana groundnut seed, t/lb	10.00	12.00
Sulphate of ammonia, MK/50 kg	6.70	7.00
Compound 20.20.0, MK/50 kg	9.00	9.60
Credit charge, %	12.5	15.00

2/ Seed rates, lb/ac

Rice	60
Maize	22
Malimba groundnuts	60
Chalimbana groundnuts	80

3/ Fertilizer rates, kg/ac

Improved rainfed rice: 75 kg sulphate of ammonia
Irrigated rice: 150 kg sulphate of ammonia
Improved maize: 50 kg sulphate of ammonia and 50 kg compound 20 20.0

4/ Improved cotton: 8 sprays of DDT, sevin and dimethoate

5/ Includes spraying equipment for improved cotton

ANNEX 11
Table 1

MALAWI

KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Crop Margins per Acre and per Man-Day, Chitipa District

	Unimproved Mixture of:				Unimproved Millet	Unimproved Cassava	Improved Local Maize	Improved Composite Or Synthetic Maize		Improved Groundnuts		Pure Stand Beans
	Maize	Beans	Groundnuts	Total (Malimba)				Hand cultivated	Ox-cultivated	Hand cultivated (Chalimbana)	Ox-cultivated (Manipintar)	
<u>Margins at Official 1976 Prices ^{1/}</u>												
Production												
- Yield, lb/ac	600	80	70		1,200	1,800	2,200	2,400	2,400	500	750 ^{4/}	400
- Value, MK/ac	13.50	4.00	4.90	22.40	18.00	18.00	49.50	54.00	54.00	40.00	33.75	20.00
Costs, MK/ac												
- Seed ^{2/}	0.35	0.25	0.70	1.30	0.25	-	0.50	0.70	0.70	6.95	5.35	1.25
- Fertilizer ^{3/}	-	-	-	-	-	-	15.70	15.70	15.70	-	-	-
- Small tools	-	-	-	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
- Ox-cultivation	-	-	-	-	-	-	-	-	5.00	-	5.00	-
- Credit charge	-	-	-	-	-	-	1.95	2.00	2.00	0.35	0.25	-
Total	-	-	-	3.30	2.25	2.00	20.15	20.40	25.40	9.30	12.60	3.25
Margin, MK/ac	-	-	-	19.10	15.75	16.00	29.35	33.60	28.60	30.70	21.15	16.75
Number of labour days	-	-	-	50	45	40	50	50	34	85	50	40
Margin, MK/day	-	-	-	0.38	0.35	0.40	0.59	0.67	0.84	0.36	0.42	0.42
<u>Margins at Projected 1980 Prices ^{1/}</u>												
Value of Production, MK/ac	13.50	4.00	6.30	23.80	18.00	18.00	49.50	54.00	54.00	50.00	41.25	20.00
Costs, MK/ac												
- Seed ^{2/}	0.35	0.25	0.90	1.50	0.25	-	0.50	0.70	0.70	8.55	6.75	1.25
- Fertilizer ^{3/}	-	-	-	-	-	-	18.20	18.20	18.20	-	-	-
- Small tools	-	-	-	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
- Ox-cultivation	-	-	-	-	-	-	-	-	5.00	-	5.00	-
- Credit Charge	-	-	-	-	-	-	2.75	2.80	2.80	0.50	0.40	-
Total	-	-	-	3.50	2.25	2.00	23.45	23.70	28.70	11.05	14.15	3.25
Margin MK/ac	-	-	-	20.30	15.75	16.00	26.05	30.30	25.30	38.95	27.10	16.75
Margin, MK/day	-	-	-	0.41	0.35	0.40	0.52	0.61	0.74	0.46	0.54	0.42

^{1/} Price Assumptions

	1976	1980
Maize, t/lb	2.25	2.25
Groundnuts, Malimba-shelled, t/lb	7.00	9.00
Groundnuts, Chalimbana-shelled, t/lb	8.00	10.00
Groundnuts, Manipintar-unshelled, t/lb	4.50	5.50
Beans, t/lb	5.00	5.00
Millet, t/lb	1.50	1.50
Cassava, t/lb	1.00	1.00
Composite or synthetic maize seed, t/lb	5.00	5.00
Chalimbana groundnut seed, t/lb	10.00	12.00
Manipintar groundnut seed, t/lb	9.00	11.00
Sulphate of ammonia, MK/50 kg	6.70	7.80
Compound 20.20.0, MK/50 kg	9.00	10.40
Credit charge, %	12.5%	15 %

^{2/} Seed rates, lb/ac

Unimproved mixture:	
maize	15
beans	5
groundnuts	10
Composite or synthetic maize	22
Malimba groundnuts	60
Manipintar groundnuts	70
Chalimbana groundnuts	80
Beans	25

^{3/} Fertilizer rates, kg/ac

Improved maize: 50 kg of sulphate of ammonia, and
50 kg compound 20 20 0

^{4/} Unshelled; other groundnut yields shelled

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KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Budget for a 4 Acre Karonga Rice Farm

	<u>Without Project</u>					<u>With Project - Rainfed Rice</u>					<u>Irrigated Rice</u>				
	Crop Area (ac)	Labour Days (no.)	Value of Production (MK)	Costs (MK)	Margin (MK)	Crop Area (ac)	Labour Days (no.)	Value of Production (MK)	Costs (MK)	Margin (MK)	Crop Area (ac)	Labour Days (no.)	Value of Production (MK)	Costs (MK)	Margin (MK)
<u>Margins at Official 1976 Prices</u>															
Rainfed rice, unimproved	2.0	120	144.00	9.40	134.60	-	-	-	-	-	-	-	-	-	-
Rainfed rice, improved	-	-	-	-	-	2.0	140	216.00	33.50	182.50	-	-	-	-	-
Irrigated rice	-	-	-	-	-	-	-	-	-	-	3.0 ^{1/}	255	405.00	84.15	320.85
Maize, unimproved	1.0	40	18.00	2.50	15.50	1.0	40	18.00	2.50	15.50	1.0	40	18.00	2.50	15.50
Cassava	1.0	40	18.00	2.00	16.00	1.0	40	18.00	2.00	16.00	1.0	40	18.00	2.00	16.00
Total	4.0	200	180.00	13.90	166.10	4.0	220	252.00	36.00	214.00	5.0	335	441.00	88.65	352.35
Average margin per acre					41.50					53.50					88.10
Average margin per day					0.83					0.97					1.05
<u>Margins at Projected 1980 Prices</u>															
Rainfed rice, unimproved	2.0	120	144.00	9.40	134.60	-	-	-	-	-	-	-	-	-	-
Rainfed rice, improved	-	-	-	-	-	2.0	140	216.00	34.50	181.50	-	-	-	-	-
Irrigated rice	-	-	-	-	-	-	-	-	-	-	3.0 ^{1/}	255	405.00	88.05	316.95
Maize, unimproved	1.0	40	18.00	2.50	15.50	1.0	40	18.00	2.50	15.50	1.0	40	18.00	2.50	15.50
Cassava	1.0	40	18.00	2.00	16.00	1.0	40	18.00	2.00	16.00	1.0	40	18.00	2.00	16.00
Total	4.0	200	180.00	13.90	166.10	4.0	220	252.00	39.00	213.00	5.0	335	441.00	92.55	348.45
Average margin per acre					41.50					53.25					87.10
Average margin per day					0.83					0.97					1.04

^{1/} Assumed cropping intensity 150%.

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KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Budget for a 4 Acre Karonga Dryland Farm

	Without Project					With Project				
	Crop Area (ac)	Labour Days (no.)	Value of Production (MK)	Costs (MK)	Margin (MK)	Crop Area (ac)	Labour Days (no.)	Value of Production (MK)	Costs (MK)	Margin (MK)
<u>Margins at Official 1976 Prices</u>										
Maize, local, unimproved	1.6	64	28.80	4.00	24.80	-	-	-	-	-
Maize, composite or synthetic	-	-	-	-	-	1.0	50	49.50	20.40	29.10
Groundnuts, unimproved	0.4	26	8.40	2.50	5.90	-	-	-	-	-
Groundnuts, improved	-	-	-	-	-	1.0	85	36.00	9.35	26.65
Cotton, unimproved	0.2	14	4.80	0.40	4.40	-	-	-	-	-
Cotton, improved	-	-	-	-	-	1.0	90	64.00	21.15	42.85
Cassava	1.8	72	32.40	3.60	28.80	1.0	40	18.00	2.00	16.00
Total	4.0	176	74.40	10.50	63.90	4.0	265	167.50	52.90	114.60
Average margin per acre					16.00					28.65
Average margin per day					0.36					0.43
<u>Margins at Projected 1980 Prices</u>										
Maize, local, unimproved	1.6	64	28.80	4.00	24.80	-	-	-	-	-
Maize, composite or synthetic	-	-	-	-	-	1.0	50	49.50	21.85	27.65
Groundnuts, unimproved	0.4	26	10.80	2.95	7.85	-	-	-	-	-
Groundnuts, improved	-	-	-	-	-	1.0	85	45.00	11.05	33.95
Cotton, unimproved	0.2	14	6.60	0.40	6.20	-	-	-	-	-
Cotton, improved	-	-	-	-	-	1.0	90	88.00	21.55	66.45
Cassava	1.8	72	32.40	3.60	28.80	1.0	40	18.00	2.00	16.00
Total	4.0	176	78.60	10.95	67.65	4.0	265	200.50	56.45	144.05
Average margin per acre					16.90					36.00
Average margin per day					0.38					0.54

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KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Budget for a 4 and a 8 Acre Chitipa Farm

	Without Project					With Project - Hand Cultivation					With Project - Ox-Cultivation ^{1/}				
	Crop Area (ac)	Labour Days (no.)	Value of Production (MK)	Costs (MK)	Margin (MK)	Crop Area (ac)	Labour Days (no.)	Value of Production (MK)	Costs (MK)	Margin (MK)	Crop Area (ac)	Labour Days (no.)	Value of Production (MK)	Costs (MK)	Margin (MK)
<u>Margins at Official 1976 Prices</u>															
Mixture maize/beans/groundnuts	2.5	125	56.00	8.25	47.75	-	-	-	-	-	-	-	-	-	-
Improved local maize	-	-	-	-	-	1.0	50	49.50	20.15	29.35	-	-	-	-	-
Composite or synthetic maize	-	-	-	-	-	1.0	50	54.00	20.40	33.60	4.0	136	216.00	101.60	114.40
Chalimbana groundnuts	-	-	-	-	-	0.5	42	20.00	4.65	15.35	-	-	-	-	-
Manipintar groundnuts	-	-	-	-	-	-	-	-	-	-	2.5	125	84.40	31.50	52.90
Pure stand beans	-	-	-	-	-	0.5	20	10.00	1.60	8.40	0.5	20	10.00	1.60	8.40
Cassava	1.0	40	18.00	2.00	16.00	0.5	20	9.00	1.00	8.00	0.5	20	9.00	1.00	8.00
Millet	0.5	23	9.00	1.15	7.85	0.5	23	4.50	0.60	3.90	0.5	23	4.50	0.60	3.90
Total	4.0	188	83.00	11.40	71.60	4.0	205	147.00	48.40	98.60	8.0	324	323.90	136.30	187.60
Average margin per acre					17.90					24.65					23.45
Average margin per day					0.38					0.48					0.57
<u>Margins at Projected 1980 Prices</u>															
Mixture maize/beans/groundnuts	2.5	125	59.50	8.75	50.75	-	-	-	-	-	-	-	-	-	-
Improved local maize	-	-	-	-	-	1.0	50	49.50	23.45	26.05	-	-	-	-	-
Composite or synthetic maize	-	-	-	-	-	1.0	50	54.00	23.70	30.30	4.0	136	216.00	114.80	101.20
Chalimbana groundnuts	-	-	-	-	-	0.5	42	25.00	5.50	19.50	-	-	-	-	-
Manipintar groundnuts	-	-	-	-	-	-	-	-	-	-	2.5	125	103.15	35.40	67.75
Pure stand beans	-	-	-	-	-	0.5	20	10.00	1.60	8.40	0.5	20	10.00	1.60	8.40
Cassava	1.0	40	18.00	2.00	16.00	0.5	20	9.00	1.00	8.00	0.5	20	9.00	1.00	8.00
Millet	0.5	23	9.00	1.15	7.85	0.5	23	4.50	0.60	3.90	0.5	23	4.50	0.60	3.90
Total	4.0	188	86.50	11.90	74.60	4.0	205	152.00	55.85	96.15	8.0	324	342.65	153.40	189.25
Average margin per acre					18.65					24.05					23.65
Average margin per day					0.40					0.47					0.58

^{1/} Beans, cassava and millet: hand cultivation.

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KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Economic Costs and Benefits

1. Economic analyses have been made for the KRDP and Lake Transport parts of the Project, but not for the two year NRDP component because of the preliminary nature of the investments involved. The economic analysis for the Lake Transport Component is at Annex 13. This Annex deals with the KRDP part of the Project only.

2. No precise information is yet available on the actual investments during the first Phase project, particularly the break-down thereof into the various Project components. The economic analysis is therefore limited to the second Phase Project only subject to the following qualifications. On the cost side it has not been possible to separate the impact of staff recruited under Phase I from that of incremental staff to be hired under Phase II. Therefore the costs of all incremental staff of Phases I and II combined have been included in the calculations. On the benefit side it is not possible to identify what proportions of the incremental production during the early years of the Phase II Project would result from investments made under Phase I and which parts would result from Phase II investments. Therefore the values of all incremental production during the implementation of Phase II have been included in the benefits with the exception of further production increases from the irrigated rice schemes since no additional investments in irrigation would be made under Phase II. ^{1/} Under these assumptions the "without Project" case is characterized by a level of staffing and services similar to the pre-Phase I project situation and production which would stagnate at the level reached by the end of the Phase I project. The probability that this "without Project" case would occur is not great because, in the unlikely event that no external financial support could be secured for some form of a follow-up project, Government would probably not withdraw all incremental Phase I project staff. A certain minimum level of services (although difficult to specify) would probably also be needed to maintain the Phase I project production level. It would therefore be justifiable to reduce the costs in the "with Project" case somewhat, which would result in a slightly higher internal economic rate of return than calculated, but this has not been done.

^{1/} A different approach can be followed by excluding on the cost side the maintenance costs of the Phase I project as estimated at the time of its appraisal (corrected for inflation), and by excluding on the benefit side the crop areas for which incremental production values were claimed as benefits in the Phase I appraisal. This was done in a separate calculation and the resulting IER (12%) came surprisingly close to the one which was found by following the approach outlined in paragraph 2.

3. The costs included in the calculations comprise overhead costs (Project costs for the first years and maintenance costs thereafter) and direct production costs associated with the cultivation of the various crops. As for the Project costs, the costs of the health, research and evaluation components were excluded since benefits are not quantifiable. The additional health facilities would improve the standard of living of the population and would also have some positive effect on the levels of crop production. Both agricultural and hydrological research are expected to result in further improvements of agricultural production techniques and the introduction of new crop varieties at later stages; research staff would also assist extension staff with the implementation of farm-scale tests and demonstrations of improvements included in this Project. It would therefore be methodologically correct to include a small part of the costs of the health and research components in the economic analysis, but since it is difficult to specify this and the impact on the Project's economic rate of return would be small, this has not been done. The costs and benefits of the livestock component have not been included in the economic analysis either, mainly because lack of data and continuous movements of cattle across the borders with Tanzania and Zambia preclude a realistic assessment of the benefits. Moreover, the costs involved are almost entirely maintenance costs of Phase I investments and are lower than those estimated during the appraisal of the Phase I project (corrected for inflation) because of a reduction in the scope of the livestock component. The full costs of extension and land husbandry services and ADMARC construction have been included in the economic costs, and further, 80% of the costs of the mechanical maintenance and construction sections and the management unit, and 90% of the costs of the Project's finance and credit section (the excluded balance of these cost items is assumed to be associated with the health, research and evaluation components). The costs included in the economic evaluation represent about two thirds of total costs. Direct costs of improved crop production include the projected farmgate costs of fertilizer, improved seeds, insecticides and spraying equipment (cotton), and the costs of ploughing by oxen (Chitipa). Not included are the costs of small tools, which are assumed to be the same in the with and without Project cases, and the costs of incremental family labour, which are assumed to be nil because no alternative employment opportunities exist. Fertilizer prices have been based on the IBRD commodity price forecasts and the latest information on the costs of transport. Details are shown in Table 1.

4. Benefits consist of the value of incremental rice, maize, groundnut and cotton production. Economic farmgate values for these crops have been based on past sales prices, IBRD's commodity price forecasts and current transport costs. Some judgements had to be made in calculating appropriate prices because the main Malawi commodities differ from the particular products for which the IBRD forecasts are compiled and because only fragmentary and incomplete sales data for the 1974/75 season could be obtained in Malawi at the time of appraisal. A further complication was that, without a firm data base, an assessment had to be made with respect to the unsatisfied

local demand for maize in Karonga and Chitipa districts. It has been assumed that of the incremental maize production, 4,000 sh ton would be consumed locally (ADMARC supplied Karonga with up to 1,500 sh ton per year in the past ten years but nothing was brought into Chitipa because of the high transport costs involved). The farmgate price at Mzimba (Karonga's principal supply area) plus transport costs to Karonga-Chitipa was used to assess the value of this part of the production. The surplus production above 4,000 sh ton would in normal years be exported out of the Northern Region (and in most cases out of the country) but it is assumed that in one out of every eight years significant imports would be required because of harvest failures. The weighted average of export parities, based on sales to UK (most important buyer in the past), and import parities has been used in the calculations. The international prices of Chalimbana confectionery groundnuts have increased sharply in the last two years but probably because of long-term contract arrangements the increase has hardly been reflected in the export price of Malawi's Chalimbana groundnuts. A conservative export value of MK 350/sh ton, c.i.f. UK, which is higher than Malawi received in 1975 but much lower than export prices for comparable Nigerian and Natal confectionery groundnuts, has been assumed in this appraisal. The equivalent 1976 farmgate value, allowing for buying, grading and transport charges, works out at MK 250/sh ton for Karonga; this price has been used in the economic evaluation. For Manipintar groundnuts export parity prices, reflecting the trends forecasted by IBRD have been used. Relatively more recent price information was available for cotton and rice; economic farmgate values for 1976 were determined on the basis of export parities, since both cotton and rice are exported, and IBRD forecast price trends were used for the calculation of future values. All projected farmgate values of crops are at Table 1 and a summary of economic costs and benefits at Table 2.

5. Based on the above assumptions, the internal economic return (IER) for the second phase of KRDP has been calculated at 14%. This is rather low, compared with other agricultural projects in Malawi,^{1/} and is due mainly to the disadvantageous location of the Project in the extreme north of the country. This necessarily leads to high costs of transport, both for farm inputs and for crop products. Sensitivity analysis indicates that the IER would decrease to 9% if costs were to increase by 10% and to 8% if benefits would be 10% lower because of lower yields or lower crop prices. A combination of both adverse factors would reduce the IER to 3%. However, since the yield estimates for the Project, as projected in the Government's project report, were scaled down significantly during appraisal on the basis of experience from the first phase project, the probability of yields decreasing further should be considered low. If family labour were to be shadow priced at 25% of the daily wage rate rather than zero, the internal economic rate of return would decrease from 14% to 13%.

March 24, 1976

^{1/} SVADP - Phase II had an I.E.R. of 22% and LLDP - Phase III 18%.

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KARONGA RURAL DEVELOPMENT PROJECT, PHASE II

Farm gate Values Used in the Economic Evaluation

Year	Unit	1 (1976/77)	2 (1977/78)	3 (1978/79)	4 (1979/80)	5 (1980/81)	6 (1981/82)	7 (1982/83)	8 (1983/84)	9 and onwards (1984/85 and onwards)
<u>Karonga</u> ^{1/}										
Paddy rice	MK/sh ton	124	115	110	106	106	106	106	106	106
Chalimbana groundnuts, shelled	MK/sh ton	250	250	250	250	250	250	250	250	250
Seed cotton	MK/sh ton	295	290	290	290	290	290	290	290	290
Sulphate of ammonia	MK/ m ton	162	156	151	141	142	144	146	148	150
Compound 20.20.0 fertilizer	MK/ m ton	228	219	211	200	199	201	203	205	207
Rice seed	MK/sh ton	130	130	130	130	110	110	110	110	110
Chalimbana groundnut seed	MK/sh ton	300	300	300	300	300	300	300	300	300
Composite/Local maize seed	MK/sh ton	100	100	100	100	100	60	60	60	60
Cotton spraying, including equipment	MK/ acre	17	17	17	17	17	17	17	17	17
<u>Chitipa</u> ^{1/}										
Manipintar groundnuts, shelled	MK/sh ton	240	215	200	190	200	210	220	230	235
Chalimbana groundnuts, shelled	MK/sh ton	240	240	240	240	240	240	240	240	240
Sulphate of ammonia	MK/ m ton	178	172	167	157	158	160	162	164	166
Compound 20.20.0 fertilizer	MK/ m ton	244	235	227	216	215	217	219	221	223
Local maize seed	MK/sh ton	41	41	41	41	41	41	41	41	41
Composite/Local maize seed	MK/sh ton	100	80	80	80	80	80	80	80	80
Manipintar groundnut seed	MK/sh ton	250	250	250	250	250	250	250	250	250
Chalimbana groundnut seed	MK/sh ton	300	300	300	300	300	300	300	300	300
Oxen-ploughing	MK/ acre	5	5	5	5	5	5	5	5	5
<u>Karonga and Chitipa</u>										
Maize:										
first 4,000 sh ton	MK/sh ton	64	64	63	61	61	61	61	61	61
surplus over 4,000 sh ton	MK/sh ton	41	41	41	41	41	41	41	41	41

^{1/} All seed prices, except for local maize seed in Chitipa, are estimated averages assuming the use of purchased fresh seeds once in every three years and seeds retained from own production in the other two years.

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KARONGA RURAL DEVELOPMENT PROJECT, PHASE II

Economic Benefits and Costs
(MK'000)

Year	1 (1976/77)	2 (1977/78)	3 (1978/79)	4 (1979/80)	5 (1980/81)	6 (1981/82)	7 (1982/83)	8 (1983/84)	9 (1984/85)	10 and onwards (1985/86 and onwards)
<u>Benefits</u>										
Rice	74	138	198	254	254	254	254	254	254	254
Maize	35	90	161	231	287	340	398	457	505	505
Groundnuts, Chalimbana	23	44	68	102	126	131	136	142	148	157
Groundnuts, Manipintar	4	15	32	50	74	99	127	157	173	173
Cotton	<u>55</u>	<u>107</u>	<u>161</u>	<u>219</u>	<u>262</u>	<u>262</u>	<u>262</u>	<u>262</u>	<u>262</u>	<u>262</u>
Total Benefits	191	394	620	856	1,003	1,086	1,177	1,272	1,342	1,351
<u>Costs</u>										
<u>Direct Costs</u>										
Rice	24	47	68	87	84	85	86	86	87	87
Maize	25	58	99	131	172	204	244	286	322	322
Groundnuts, Chalimbana	9	16	25	35	43	47	51	55	59	59
Groundnuts, Manipintar	2	4	9	15	20	26	26	31	37	37
Cotton	<u>9</u>	<u>17</u>	<u>26</u>	<u>34</u>	<u>40</u>	<u>40</u>	<u>40</u>	<u>40</u>	<u>40</u>	<u>40</u>
Total Direct Costs	69	142	227	302	359	402	447	498	545	545
<u>Overhead Costs</u>										
Extension	200	229	206	133	146	146	146	146	146	146
Land husbandry	54	42	39	8	9	9	9	9	9	9
Construction	233	217	112	42	30	30	30	30	30	30
Mechanical Maintenance	60	36	32	22	24	24	24	24	24	24
Finance and Credit	171	168	139	103	113	113	113	113	113	113
Project Management	59	56	47	52	58	58	58	58	58	58
ADMARC Constructions	<u>158</u>	<u>158</u>	<u>150</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>	<u>-</u>
Sub-total	935	906	725	360	380	380	380	380	380	380
Physical Contingency 5%	<u>47</u>	<u>45</u>	<u>36</u>	<u>18</u>	<u>19</u>	<u>19</u>	<u>19</u>	<u>19</u>	<u>19</u>	<u>19</u>
Total Overhead Costs	<u>982</u>	<u>951</u>	<u>761</u>	<u>378</u>	<u>399</u>	<u>399</u>	<u>399</u>	<u>399</u>	<u>399</u>	<u>399</u>
Total Costs	1,051	1,093	988	680	758	801	846	897	944	944
Net Benefits/(Costs)	(860)	(699)	(368)	176	245	285	331	375	398	407

Internal Economic Rate of Return : 14%

Sensitivity Analysis

Costs + 10%, IER: 9%
Benefits - 10%, IER: 8%
Costs + 10%, and Benefits - 10%, IER: 3%

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KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Lake Transport

A. Freight Routes between Karonga District and the South

1. Existing freight traffic to and from Karonga district is shipped by the Lake Service of Malawi Railways through terminals at Kambwe (near Karonga town), Chilumba, and the southern port and railhead at Chipoka, which is 257 miles from Chilumba and 297 miles from Kambwe.

2. At present there is no road link from Karonga district offering a practical alternative to the Lake Service. However, the Federal Republic of Germany has financed a 20-mile extension of the Karonga-Chilumba road south to Chiweta, as the first section of a new road to Muhuju over the difficult escarpment, ultimately to replace the existing track which is unsuitable for normal commercial traffic. The African Development Bank is financing the detailed engineering for the following section to Rumphi. The Government anticipates that within the next four years, an all-weather road, most of it bitumen, will have been completed over most of the distance from Chipoka to Nkhata Bay, and on to Chilumba via the principal northern center of Mzuzu.

3. With the rehabilitation of the port of Chipoka proposed for financing under the Project, Karonga district freight traffic as well as other traffic would be handled much more expeditiously and efficiently than would be the case without this improvement (paragraph 15).

B. The Lake Service

General

4. The Lake Service on Lake Malawi is owned and operated by Malawi Railways Limited, which in turn is a Government entity, but with some private owner interests. The Service operates the following vessels:

<u>Vessel</u>	<u>Capacity</u>		
	<u>Dry Cargo</u> (short ton)	<u>Bulk Petroleum</u> <u>Products (short ton)</u>	<u>Passengers</u>
Mkwazi	200	-	-
Mpasa	60	125	-
Ilala	100	-	460 - day 300 - night
Chauncey Maples	20	-	-
Self-propelled barge <u>1/</u>	300	-	-
Tug and barge <u>2/</u>	600	-	-

1/ Provided under Karonga Rural Development Project - Phase I

2/ Provided by the Government for the Viphya Pulp and Paper Project, presently being assembled at Monkey Bay.

In addition the Lake Service also owns four tugs, one launch, two oil pontoons, and six barges.

5. The Lake Service provides both freight and passenger service, and is the principal means of communication along the 350-mile length of Lake Malawi which forms the eastern boundary of the country.

6. In recent years, the Lake Service has been generally operating at a loss, as shown below:

	<u>1968</u>	<u>1969</u>	<u>1970</u>	<u>1971</u>	<u>1972</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1/</u>
	-----MK'000-----								
<u>Revenues</u>									
Passenger and Parcels	89	102	108	128	105	132	132	147	
Freight	75	149	187	259	321	478	493	483	
Other	<u>10</u>	<u>12</u>	<u>16</u>	<u>58</u>	<u>39</u>	<u>48</u>	<u>62</u>	<u>30</u>	
Total Revenues	174	263	311	445	465	658	687	660	
<u>Expenses</u>									
Depreciation	61	62	60	51	53	55	51	51	
Other	<u>396</u>	<u>414</u>	<u>417</u>	<u>529</u>	<u>595</u>	<u>582</u>	<u>709</u>	<u>844</u>	
Total Expenditures	457	476	477	580	648	637	760	895	
Surplus/(Deficit)	(283)	(213)	(166)	(135)	(183)	21	(73)	(235)	

1/ Estimate

7. The growing deficit in 1975 results from a decline in cargo traffic and substantial increases in operating costs (particularly for equipment and stores).

8. The failure of the Lake Service to meet its operating costs, even excluding depreciation, suggests that tariffs are too low. To avoid a cross-subsidization of the Lake Service by the Railways, the Government and the Railways should take steps to ensure that:

- (i) the level and structure of Lake Service tariffs cover the cost of individual services; and
- (ii) taken as a whole the tariff provides adequate revenue to cover the full cost of the Service including depreciation or debt service, whichever is greater.

Freight Traffic and Shipping Capacity

9. Traffic statistics for the Lake Service show that the traffic pattern is dominated by the railhead at Chipoka. In 1975, Chipoka port handled 32,220 short ton of cargo, or 91% of total Lake traffic. Northbound traffic accounted for 70% of Chipoka port traffic, the main destinations being Nkhata Bay and the Karonga district:

	<u>Dry and Bulk Cargo</u> (short ton)			
	<u>1970</u>	<u>1973</u>	<u>1974</u>	<u>1975</u> <u>1/</u>
<u>Northbound</u>				
- from Chipoka	13,800	23,087	24,120	22,517
- from other ports	<u>400</u>	<u>872</u>	<u>700</u>	<u>600</u>
Total Northbound	14,200	23,959	24,820	23,117
<u>Southbound</u>				
- to Chipoka	4,000	8,083	10,600	9,700
- to other ports	<u>1,500</u>	<u>3,627</u>	<u>2,600</u>	<u>2,300</u>
Total Southbound	<u>5,500</u>	11,710	13,200	12,000
Total Both Directions <u>2/</u>	<u>19,000</u>	<u>35,669</u>	<u>38,020</u>	<u>35,117</u>

1/ Estimate

2/ Shipments of less than five ton are not included.

10. These data show that Lake traffic has not increased significantly over the last three years; however rather than signifying a slackening of the demand for Lake transportation services, this suggests that the existing fleet and cargo handling facilities have reached the limit of their capacity.

11. The imbalance of traffic may suggest at first sight that there is enough spare capacity to accommodate all the increased southbound tonnage expected from the Karonga district. This is not so, because the additional tonnage would substantially increase average round trip time between Chipoka and the north, especially in view of the time required for loading and unloading with existing terminal facilities at Chipoka. Even with existing traffic, congestion and delays are an everyday feature at Chipoka and the increased traffic generated by the Karonga Rural Development Project will further aggravate the situation.

12. Delays at Chipoka result from the poor condition of the present jetty, parts of which are falling away; silting up of the berthing face; restricted space, absence of dependable cargo handling equipment; and exposure to the southeast winds of vessels moored to the present jetty.

13. Improvements to berthing and cargo handling facilities at the port will increase the effective capacity of the Lake Service by increasing the fleet availability (Table 1). With the future addition of the 600 ton pontoon, this increased capacity of the Lake Service should adequately accommodate all traffic forecast until the 1990's (Table 2).

Rehabilitation Proposals

14. The items included in the project for rehabilitation and improvement of the Lake Service are as follows:

	<u>MK'000</u>
<u>Chipoka Port</u>	
Construction of berths, transit shed, rail siding, access road, utilities, and supporting facilities <u>1/</u>	1,376
Cargo handling equipment	139
<u>Refitting of MV Mpasa</u>	<u>21</u>
Sub-total	1,536
Physical Contingencies <u>2/</u>	139
Price Contingencies <u>3/</u>	<u>404</u>
Total Cost	2,079

1/ Includes 12% for design and supervision.

2/ Included at 10% of base cost, excluding design and supervision.

3/ Included at 13% of base cost plus physical contingencies for Year 1 and 12% for Year 2.

C. Economic Justification for Rehabilitating Chipoka Port

15. A 100% increase in cargo traffic is anticipated between 1975 and 1985 (Table 3). To handle this traffic on the Lake Service would require the improvement of berthing and cargo handling facilities at Chipoka; otherwise fleet capacity is limited to current port capacity (Tables 1 and 2). Furthermore, the condition of the Chipoka facility is deteriorating at such a rate that its usefulness is rapidly diminishing. If the proposed improvements are foregone, most of Chipoka traffic will have to be handled through lighterage, which is already needed when the Lake level is low. Lighterage, however, would not constitute a viable alternative to the proposed improvements: both its initial cost (Table 4) and its operating cost are greater. This is because:

- (i) the cost of a quay wall necessary to handle the lighterage operation is 90% of that required for alongside berthing;
- (ii) ancillary facilities - a railway siding, a transit shed, utilities, a storage area, etc. - are identical for either alternative;
- (iii) the cargo handling equipment for lighterage is substantially greater since it includes a requirement for three lighters and a tug, in addition to the fork lift and mobile crane also required for either alternative;
- (iv) labor costs are increased for the additional handling required in the lighterage operation;
- (v) the cargo damage rate for lighterage increases to an estimated 2% of cargo value as opposed to 0.5% for alongside quay handling; and
- (vi) the cargo handling rate is lower in the lighterage operation (Table 5).

16. In comparison with the alternative of road transport, the larger capital outlay needed by the Lake Service is more than compensated by its lower operating costs. The economic cost of Lake transportation consists of:

- (i) the capital cost for the harbour improvement at Chipoka;
- (ii) cargo handling cost at both terminals;
- (iii) harbour maintenance cost; and
- (iv) vessel operating and maintenance costs.

The economic cost of road transportation consists only of:

- (i) the cost of truck transportation, estimated at 4.3 t per ton mile; and
- (ii) the cost of additional road maintenance estimated at MK 28,000 per year (Table 6).

The heavy investment needed to build a bitumen road linking Karonga district to Chipoka has been ignored, on the assumption that this will be completed whether the Lake Service is rehabilitated or not. Even so, comparison with the economic costs of the Lake Service suggests that over a 20-year period, conveyance by the Lake offers savings equivalent to an economic return of about 18% on the proposed Chipoka port improvements. If the costs of the latter were increased by 10%, the improvement would still yield a return of about 16%.

17. The refitting of the motor vessel Mpasa to increase its oil-carrying capacity to 200 ton is necessary to cope with the expected traffic increase from 8,700 ton in 1975 to over 18,000 ton in 1985. The existing fleet could not otherwise handle such an increase (Table 7).

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KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Total One-Way Capacity of the Lake Fleet
(all cargo)

<u>Ship</u>	<u>Mpasa</u>	<u>Ilala</u>	<u>Mkwazi</u>	<u>Self-Propelled Barge</u>	<u>Fontoon</u>	<u>One-Way Cargo Pick-Up</u>	
						<u>Pontoon Excluded</u> (rounded)	<u>All Ships</u>
1) Theoretical Cargo Capacity (short tons)	200	100	200	380	600		
2) Average Load per Trip (short tons)	140	70	140	270	420		
<u>Roundtrip Time (days)</u>							
3) Terminal time							
- At Present	6	4	6	6	-		
- Following Planned Improvements ^{1/}	3.6	2.4	3.6	3.6	6		
4) Sailing Time ^{2/}	2.2	2.2	2.2	2.7	2.2		
5) Spare Time (days) ^{3/}	1.5	1.5	1.5	1.5	1.5		
<u>Total Roundtrip Time (days)</u>							
6) At Present	9.7	7.7	9.7	10.2	-		
7) Following Planned Improvements	7.3	6.1	7.3	7.3	9.7		
<u>Number of One-Way Trips per Year</u>							
8) At Present ^{4/}	37	47	37	36	-		
9) Following Improvements ^{5/}	50	60	50	47	38		
<u>Total One-Way Cargo per Year (short ton)</u>							
10) At Present ^{6/}	4,791 ^{8/}	3,290	5,180	9,720	-	23,000	-
11) Following Planned Improvements ^{7/}	7,000	4,200	7,000	12,690	15,960	31,000	47,000

- ^{1/} Chipoka Harbor improvements reduce service and waiting time at Chipoka by 80%, or total terminal time (two terminals) by 40%.
^{2/} Average speed: 8 knots; roundtrip average haul of 420 miles (observed in 1973); 380-ton barge serves Chilumba-Chipoka exclusively (520 miles roundtrip).
^{3/} Allow for delays due to weather, arrivals at night or Sunday (when cargo is not worked), ship maintenance, other contingencies.
^{4/} 365 days/Line 6).
^{5/} 365 days/Line 7).
^{6/} Line 2) x Line 8).
^{7/} Line 2) x Line 9).
^{8/} Theoretical cargo capacity is 185 ton prior to refitting, giving an average of 130 ton per trip.

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MALAWIKARONGA RURAL DEVELOPMENT PROJECT, PHASE IIAnalysis of Lake Fleet Capacity
(short ton)

	(dry cargo and oil, one-way)		
	<u>1975</u>	<u>1980</u>	<u>1985</u>
1. <u>Anticipated Requirements</u>	23,117	31,800	45,500
<u>Fleet Capacity</u>			
2. <u>Assuming Existing Facilities</u> <u>at Chipoka</u>			
a) excluding 600 t pontoon	23,000	23,000	23,000
b) including 600 t pontoon ^{1/}	-	23,000	23,000
3. <u>Assuming Improved Facilities</u> <u>at Chipoka</u>			
a) excluding 600 t pontoon	23,000	31,000	31,000
b) including 600 t pontoon	-	47,000	47,000

^{1/} Currently there are no facilities for this roll on - roll off vessel.

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KARONGA RURAL DEVELOPMENT PROJECT, PHASE II
Estimated Dry Cargo Traffic on Lake Service ^{1/}
(short ton)

<u>NORTHBOUND</u>	<u>1973</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985</u>
From Chipoka to													
Nkhata Bay	9,290	10,200	9,100	8,370	7,470	7,980	8,530	9,110	9,740	10,410	11,130	11,270	12,740
Karonga District	5,110	4,700	4,200	6,240	7,040	7,880	8,630	9,310	10,020	10,770	11,540	12,350	13,010
Other	500	700	600	510	540	580	610	650	700	750	810	860	910
Other Northbound	<u>870</u>	<u>1,200</u>	<u>1,100</u>	<u>1,120</u>	<u>1,140</u>	<u>1,260</u>	<u>1,280</u>	<u>1,300</u>	<u>1,350</u>	<u>1,400</u>	<u>1,450</u>	<u>1,500</u>	<u>1,560</u>
Total Northbound	15,770	16,800	15,000	16,240	16,190	17,700	19,050	20,370	21,810	23,330	24,930	25,980	28,220
Northbound Traffic resulting from Karonga projects (included above)	-	-	-	(2,000)	(2,500)	(3,000)	(3,400)	(3,700)	(4,000)	(4,300)	(4,600)	(4,900)	(5,000)
<u>SOUTHBOUND</u>													
To Chipoka from													
Nkhata Bay	2,550	2,500	2,300	3,470	3,610	3,750	3,900	4,682	5,000	5,650	6,330	6,830	7,240
Karonga District	5,030	7,500	6,800	9,230	10,750	11,530	12,420	13,260	13,610	14,210	14,320	14,445	14,570
Other	500	600	600	80	85	100	130	140	150	160	170	180	190
Other Southbound	<u>3,630</u>	<u>2,600</u>	<u>2,300</u>	<u>2,440</u>	<u>2,580</u>	<u>2,740</u>	<u>2,900</u>	<u>3,070</u>	<u>3,260</u>	<u>3,460</u>	<u>3,670</u>	<u>3,900</u>	<u>4,130</u>
Total Southbound	11,710	13,200	12,000	15,220	17,025	18,120	19,350	21,152	22,020	23,480	24,490	25,355	26,130
Southbound Traffic resulting from Karonga (included above)	-	-	-	(8,750)	(9,500)	(10,200)	(11,000)	(11,750)	(12,000)	(12,500)	(12,500)	(12,500)	(12,500)
TOTAL DRY CARGO TRAFFIC	27,480	30,000	27,000	31,460	33,215	35,820	38,400	41,522	43,830	46,810	49,420	51,335	54,350

^{1/} Kwanga Sugar and Vipha Pulp Projects excluded.

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KARONGA RURAL DEVELOPMENT PROJECT, PHASE II

Initial Investment Required for
a Lighterage Operation at Chipoka

<u>Chipoka Terminal</u>	<u>K '000</u>
Construction of quay wall, transit shed, rail siding, access road, utilities, and supporting facilities ^{1/}	1,394
Tug and three lighters	386
Cargo handling equipment	153
<u>Refitting of MV Mpsa</u>	<u>23</u>
Total	1,956

1/ Includes 10% physical contingencies and 12% design and supervision.

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KARONGA RURAL DEVELOPMENT PROJECT, PHASE II

Cost-Benefit Analysis of Chipoka Port Improvements versus Lighterage
(MK '000)

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985 - 1995</u>
1) Economic Costs of Lighterage Alternative										
a) Investment Costs for Lighterage	508	1,448	0	0	0	0	0	0	0	0
b) Costs at Chipoka										
(i) maintenance	0	0	12	12	12	12	12	12	12	12
(ii) cargo handling costs										
- labor costs ^{1/}	0	0	56	62	66	70	76	80	82	88
- operating cost of equipment ^{2/}	0	0	6	7	7	8	8	9	9	10
c) Total Cost at Chipoka	0	0	74	81	85	90	96	101	103	110
d) Cost at Other Terminal ^{3/}	0	0	46	49	52	54	57	60	61	64
e) Vessel Operating Costs ^{4/}	0	0	89	96	100	106	113	115	119	122
f) Cargo Damage ^{5/}	0	0	143	154	167	176	189	199	205	219
Total Costs of Lighterage	508	1,448	352	380	404	426	455	475	488	515
2) Economic Cost of Improved Port Alternative										
a) Investment Costs at Chipoka	468	1,207	0	0	0	0	0	0	0	0
b) Costs at each Terminal ^{6/}										
(i) maintenance	-	-	13	13	13	13	13	13	13	13
(ii) cargo handling cost										
- labor costs	-	-	28	31	33	35	38	40	41	44
- operating cost of equipment	-	-	5	5	6	6	6	7	7	7
c) Total Cost at Both Terminals ^{7/}	-	-	92	98	104	108	114	120	122	128
d) Vessel Operating Costs ^{8/}	-	-	89	96	100	106	113	115	119	122
e) Total Cost of Improved Port Alternative	468	1,207	181	194	204	214	227	235	241	250
3) Savings Resulting from Proposed Improvements	40	241	171	186	200	212	228	240	247	265
4) Dry Cargo Traffic through Chipoka (short ton)	27,900	29,495	31,820	34,220	37,152	39,220	41,950	44,300	45,660	48,660

1/ MK 1.8 per short ton.

2/ MK .2 per short ton.

3/ MK 13,000 for maintenance, MK 1.05 per ton for cargo handling (MK .9 for labor and MK .15 for equipment).

4/ t 1.4 per ton-mile in 1976, decreasing to t 1.2 in 1985. Average haul is 210 miles.

5/ Additional damage of 1.5% of cargo carried, valued at MK 300 per ton.

6/ Same assumptions as 3/.

7/ Twice the costs at each terminal.

8/ Same as 4/.

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KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Cost-Benefit Analysis of Lake Transportation versus Road Transportation
(MK'000)

	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1981</u>	<u>1982</u>	<u>1983</u>	<u>1984</u>	<u>1985 thru 1995</u>
<u>1. Economic Cost of Lake Transportation</u>										
a) Chipoka Port Improvements	468	1,207	0	0	0	0	0	0	0	0
b) Cost at each Terminal										
(i) Maintenance ^{1/}			13	13	13	13	13	13	13	13
(ii) Cargo Handling Cost										
- Labor Cost ^{2/}			28	31	33	35	38	40	41	44
- Operating Cost of Equipment ^{3/}			5	5	6	6	6	7	7	7
c) Total Cost at Both Terminals			92	98	104	108	114	120	122	128
d) Vessel Operating Cost ^{4/}			89	96	100	106	113	115	119	122
e) Total Cost of Lake Transportation ^{5/}	468	1,207	181	194	204	214	227	235	241	250
<u>2. Economic Cost of Road Transportation</u>										
a) Truck Operating Cost ^{6/}			398	428	464	490	524	554	574	608
b) Additional Road Maintenance ^{7/}			28	28	28	28	28	28	28	28
c) Total Cost of Road Transportation			426	456	492	518	552	582	602	636
<u>3. Savings Resulting from Proposed Improvements</u>	-468	-1,207	245	262	288	304	325	347	361	386
<u>4. Dry Cargo Traffic through Chipoka (ton)</u>	27,900	29,495	31,820	34,220	37,152	39,220	41,950	44,300	45,660	48,660

^{1/} Consultant's estimate.

^{2/} MK.90 per ton - Consultant estimate.

^{3/} MK.15 per ton - Consultant estimate revised to exclude depreciation.

^{4/} t 1.4 per ton - mile in 1976, decreasing to t 1.2 per ton mile in 1985. Average haul is 210 miles.

^{5/} We assumed that losses due to cargo damage are the same for both transportation modes. The corresponding cost is therefore ignored here.

^{6/} t 4.3 per ton mile; average road haul of 290 miles.

^{7/} Required by the traffic increase.

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KARONGA RURAL DEVELOPMENT PROJECT - PHASE II

Justification for Mpasa Conversion (Increased Bulk Fuel Capacity)

	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>	<u>1979</u>	<u>1980</u>	<u>1985</u>
Total Lake Transport Requirements (ton)	8,717	9,414	10,167	10,980	11,859	12,808	18,819
Present Capability - Ilaba 30 Ton @ 48 Trips/Year	1,440	1,440	1,440	1,440	1,440	1,440	1,440
Present Capability - Tug/Pontoon 20 Ton @ 60 Trips/Year	<u>1,200</u>	<u>1,200</u>	<u>1,200</u>	<u>1,200</u>	<u>1,200</u>	<u>1,200</u>	<u>1,200</u>
Net to be Carried by Mpasa	6,077	6,774	7,527	8,340	9,219	10,168	16,179
Capability Mpasa (current - 120 tons @ 72 Trips/Year (4.65 Days/Trip) <u>1/</u>	8,640	8,640	8,640	8,640	8,640	8,640	8,640
Surplus	+2,563	+1,866	+1,113	+ 300			
Deficit					- 579	-1,528	-7,539
Capability Mpasa (converted) - 200 tons @ 85 Trips/Year (4.0 Days/Trip) <u>2/</u>	17,000	17,000	17,000	17,000	17,000	17,000	17,000
Surplus	10,923	10,226	9,743	8,660	7,781	+6,832	+ 821

1/ Assumes 335 sailing days/year.

2/ Reduced due to elimination of cargo handling.

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KARONGA RURAL DEVELOPMENT PROJECT, PHASE II

Project Implementation Schedule

Calendar Year	1976				1977				1978				1979				1980			
Quarter	3	4			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Recruitment of Additional Extension Landhusbandry and Agricultural Research Staff 1/																				
Senior Staff (STA and higher)	7				3				1											
Karonga and Chitipa					1															
N.W. Mzimba					1				1											
Thiwi-Lifidzi																				
Kawinga																				
Various Locations 2/	1																			
Junior Staff (TA and DA)	14				15				6				3							
Karonga and Chitipa					12															
N.W. Mzimba					23															
Thiwi-Lifidzi									1											
Kawinga																				
Various Locations 2/	2				3															
Construction of Staff Houses																				
Karonga and Chitipa					25				25				25							
N.W. Mzimba					19															
Thiwi-Lifidzi					33															
Kawinga					6				30											
Mosoni					23															
Lilongwe					3				3											
Various Locations 2/																				
Construction of Rural Training Centers																				
Karonga and Chitipa					1				1				1							
N.W. Mzimba					1															
Thiwi-Lifidzi					2				2											
Kawinga																				
Construction of AIMARC Markets and/or Input Stores 3/																				
Karonga and Chitipa					3				3				3							
N.W. Mzimba					1				1											
Thiwi-Lifidzi					2				1											
Kawinga									3											
Construction of Health Centers and/or Maternity Wards 3/																				
Karonga and Chitipa					4				5											
Mzimba					1															
Construction of Boreholes																				
Karonga and Chitipa					30				29				21							
Mzimba					10				10											
Thiwi-Lifidzi					15				10											
Kawinga																				
Road Construction or Improvement (miles)																				
Karonga and Chitipa					26				26				26				21			
Thiwi-Lifidzi									50											
Studies																				
MANM's Manpower Situation																				
Future Credit Arrangements																				
Preparation NRDP I																				
Budgetary Implications Agricultural Projects																				
Coffee Study																				

1/ Recruitment of various other staff not shown (see Annex 8).

2/ Mwanza, Henga, Mzimba, Gowa, Chonde, Wechisi.

3/ Excluding small input sheds.

4/ Including staff housing and boreholes.

March 2, 1976

MALAWIKARONGA RURAL DEVELOPMENT PROJECT, PHASE II

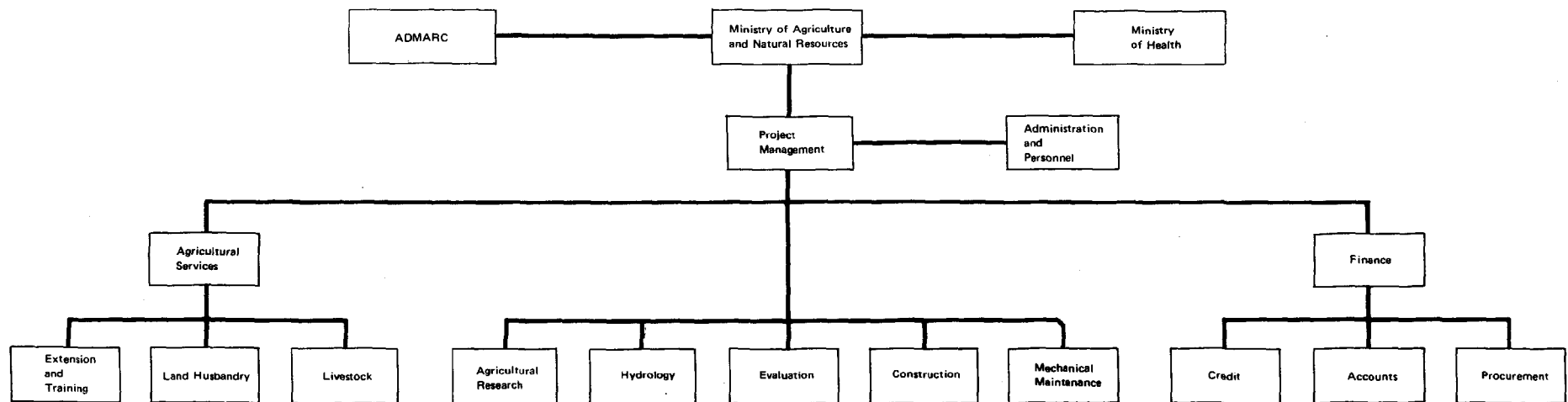
Key Indicators 1/
(Karonga and Chitipa Districts)

		Year 1 (1975/76)	Year 2 (1976/77)	Year 3 (1977/78)	Year 4 (1978/79)	Year 4 (1979/80)
<u>Improved Cropping Areas, acres</u>						
Karonga, rainfed rice	5,000	6,500	8,000	9,500	11,000	
Karonga, irrigated rice (Lufira)	500	1,000	1,250	1,500	1,500	
Karonga, dryland crops	3,375	4,875	6,375	7,875	9,375	
Chitipa	1,600	2,732	4,332	6,500	9,100	
<u>Number of Farmers Receiving Seasonal Credit</u>						
Karonga, rainfed rice	2,500	2,250	4,000	4,750	5,500	
Karonga, irrigated rice	250	500	500	500	500	
Karonga, dryland crops	2,000	2,500	3,000	3,500	3,500	
Chitipa	300	600	1,000	1,500	2,100	
<u>Distribution of Inputs on Credit</u>						
Sulphate of ammonia, m ton	594	804	1,029	1,271	1,486	
Compound 20.20.0, m ton	104	165	239	331	436	
Rice seed, sh ton	95	115	140	165	180	
Maize seed, sh ton	10	15	21	28	36	
Groundnut seed, sh ton	32	47	65	86	109	
Cotton insecticides, one acre packages	1,125	1,625	2,125	2,625	3,125	

1/ Cumulative, including Phase I developments.

March 1, 1976

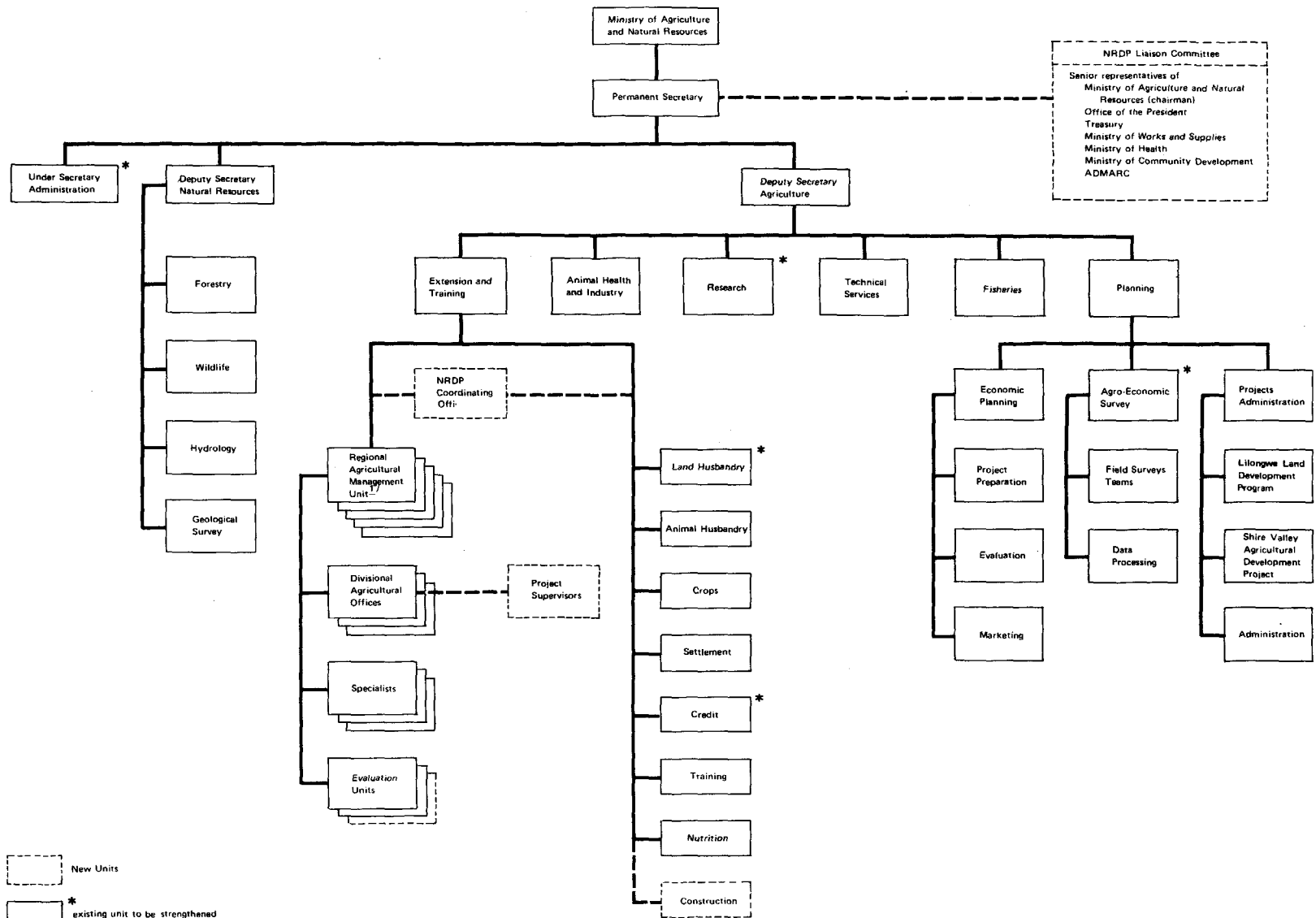
MALAWI
KARONGA RURAL DEVELOPMENT PROJECT – PHASE II
KRDP Organization Chart



January 15, 1976

World Bank-15653

MALAWI
KARONGA RURAL DEVELOPMENT PROJECT – PHASE II
Organization of the Ministry of Agriculture and Natural Resources under the
NRDP Preliminary Investment Phase
(tentative)

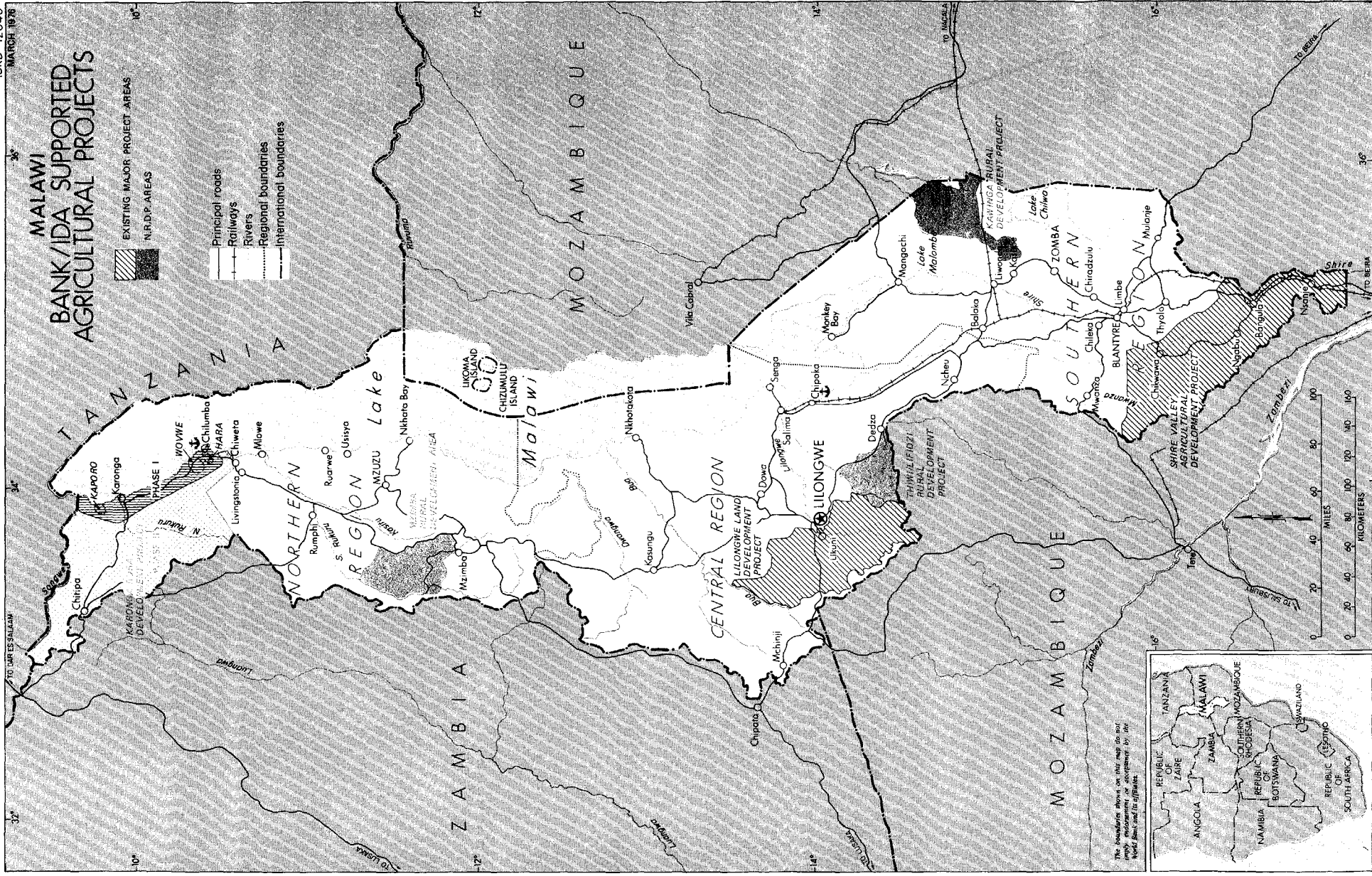


^{1/} Includes existing regional offices at Mzuzu, Lilongwe and Blantyre, and the Project Headquarters of the KRDP and CRLDP Projects.

MALAWI BANK/IDA SUPPORTED AGRICULTURAL PROJECTS

EXISTING MAJOR PROJECT AREAS
N.R.D.P. AREAS

Principal roads
Railways
Rivers
Regional boundaries
International boundaries



The boundaries shown on this map do not imply endorsement or disagreement by the World Bank and its affiliates.

