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AGRO-ECONOMY

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AGRO-ECONOMY

1. INTRODUCTION

This Annex deals with the national economy and clarifies the socio-economic conditions and present state of agriculture in the Kilimanjaro Region, Moshi District and eight villages in the Study Area for assessing the future conditions attributable to the project.

Chapter 2 deals with the present condition of national economy. The growth rate of GDP and per capita income has been analysed and GOT's development plans for economic development, rural development and irrigation development has been studied. Trends of food grains production and imports also has been analysed.

Chapter 3 shows the agricultural and socio-economic conditions of the Kilimanjaro Region. Trends of agricultural production, food situation, agricultural and rural development plans has been analysed and other socio-economic conditions such as education, medical and health services, transportation and industries are studied.

Chapter 4 is related with agriculture and socio-economy of the Moshi District where the Study Area lies. Present state of agriculture and livestock production, occupation and employment are studied. Agricultural marketing in the District as well as in Moshi municipality has been thoroughly studied because the destination of the agricultural products of the Study Area the markets in Moshi municipality.

Chapter 5 is related with general socio-economic conditions of seven villages and one ward of Moshi municipality which compose the Study Area. Major tribes, schools, health facilities, agricultural production and other economic activities are studied. The priority needs of the respective villages are also described.

Chapter 6 deals with farm economy of the Study Area. Farm management size, land tenure system, market prices of farm products and inputs, price fluctuations in the market, buying prices and selling prices are analysed. Crop budget from the view point of the farmers for each individual area under with project and without project conditions are estimated. Farm household budget is estimated under with and without project conditions. Farm incomes as well as non farm incomes, household expenditure and net reserves for each area are calculated under with and without project conditions to estimate the incremental household income and paying capacity of the farmers.

2. NATIONAL ECONOMIC SITUATION

2.1 Land and Population

Tanzania is a large country having a mainland area of approximately 950,000 km2 of which about 62,000 km2 are occupied by inland lakes. Arable lands cover some 40 million ha of which about 6 million ha have been cultivated. However much of these lands lie in regions with limited seasonal rainfall. Cereal crops are the most important crops. About 58% of the total area is cultivated with cereals followed by root crops (16%), pulses (11%) ,cotton (9%) , coffee (5%), and sisal (1%). Of the total area of cereal crops, about 58% is cultivated with maize, followed by sorghum (22%), paddy (11%), millet (7%), and wheat (2%).

According to the population census of 1988, Tanzania has a population of 23.2 million. During the last decade from 1978 to 1988, net population increase was about 5.7 million and the annual growth rate was 2.8% (refer to Table F.2.1). In 1994 those were estimated at 27.5 million and 3.2%, respectively. The total labour force was estimated at 15.6 million, and of these, some 11 million were employed while the remaining were economically inactive or unemployed. Agriculture is the main source of income and employment. The majority of the economically active population (84%) depend on agriculture which is mainly traditional, rain fed and subsistence oriented. Other sources of employment are trade and service which absorb 6.3% and 4.2% of the economically active labour force, respectively (refer to Table F. 2.2). In Tanzania the development of agriculture is important for overall economic growth and for the maintenance of macro economic stability.

2.2 GDP and Per Capita Income

Tanzania is a predominant by agricultural country. In 1995 the agricultural sector contributed more than 50% to total GDP. The important non-agricultural sectors include wholesale and retail trade, restaurant (13.6%), public administration and other services (9.7%), finance, insurance and real estate (6.5%), etc. (refer to Table F.2.3). The average GDP growth rate was recorded at 1.1% per annum (at 1976 constant prices) between 1980 and 1985, 3.9% between 1985 and 1990, and 4.1% between 1990 and 1994 (refer to Table F.2.4). From these growth rates, encouraging signs of economic recovery due to implementation of the Economic Reform Programme mentioned later were recognised. However, per capita income was stagnant or in declining trend due to a high population growth rate of 2.8% between 1978 and 1988 and about 3.2% between 1988 and 1994. The trend of per capita GDP are shown in Table F.2.5).

2.3 Development Plans

Tanzania has had the following five national development plans since the country's independence in 1961:

(a) First Three-Year Plan (1961-1964)
(b) First Five-Year Plan (1964-1969)
(c) Second Five-Year Plan (1969-1974)
(d) Third Five-Year Plan (1976-1981)
(e) Fourth Five-Year Plan (1981-1986)

Since the actual growth rates were lower than the targets and in order to cope with the economic decline towards the end of the 1970s, GOT suspended the fourth Five-Year Plan and introduced the National Economic Survival Programme (NESP) 1981-1982 and the Structural Adjustment Programme (SAP) 1982-1985. These programmes were strengthened by the Economic Recovery Programme (ERP) in 1986, followed by the Economic and Social Action Plan (ESAP) in 1989. The objectives of these programmes were : (a) increase domestic production of foods and exports, (b) restore efficiency in the mobilisation and utilisation of domestic resources, etc. The principal areas of reform in the implementation of the policies included: (a) liberalisation of agricultural markets, including prices, purchase, export and transportation of products, (b) abolition of restrictions on trade, exchange rate, private

investments and interest rates together with removal of restrictions on private banking, and (c) parastatal reforms.

The Fourth Rolling Plan and Forward Budget (RPFB) 1996/97-1998/99, which is the annual statement of the GOT's development strategy, economic targets and budgetary projections, has set the following macro economic policy objectives and targets:

(a) Achieving an overall rate of economic growth of about 5% (1996)
(b) Reducing the rate of inflation to about 15% (end of June 1997)

These objectives and targets can not be achieved without the development of agriculture because it is the most important sector in Tanzania's economy as mentioned above. However the current situation of the agriculture sector is that unreliable rainfed cultivation is predominant and agricultural production is still low. It is therefore essential to introduce irrigated agriculture and also to strengthen its operational performance, to heighten agricultural production, and finally to attain the said objectives and targets.

2.4 Trend of Food Crops Production and Imports

The main cereal crops produced are maize, sorghum, paddy, millet, and wheat as described above. Both cropped area and production of maize, sorghum and paddy have been generally increased during 10 years from 1985/86 to 1993/94. However, there was a large fluctuation in their production year by year, as a result of erratic weather condition. This tendency has been remarkable in paddy production. The details are given in Table F.2.6.

Tanzania imported substantial quantity of rice, maize and wheat between 1990 and 1994 as shown in Table F.2.7. Maize imports in 1994 were donations, while rice and wheat imports were commercial ones. It is said that there exists extensive border trade of food crops and a large portion of all traded food crops does not pass through the official channels.

According to the Annual Report of FAO on Tanzania (July 1996 to June 1997), the overall food requirement for 1997/98 is estimated at 7,134 thousand tons (4,452 thousand tons of grain and 2,682 thousand tons of non-grain food stuffs). And production estimates indicate a national deficit of 629 thousand tons, which have to be covered by food imports.

2.5 Government Objectives and Policies for Agriculture Development

The agriculture sector plays a dominant role in the national economy. It employs about 84 % of the employed population and accounts for over 50 % of GDP and 75 % of foreign exchange earnings as described before. Furthermore, it is the main source for food supply and raw materials for the industrial sector as well as the major market for industrial goods and services. Despite the fact that the majority of population depends on the sector, the national food security has been one of the critical agricultural policy issues of GOT and the strengthening of food crops production and attainment of food self-sufficiency continue to be the main pillars of the national economic development policies. The Fourth Rolling Plan and Forward Budget (1996/97 - 1998/99) is setting the major objectives for the agriculture sector and the policies to achieve the said objectives as follows;

(1) Major Objectives for Agriculture Sector

- To achieve national self-sufficiency in food and to raise the nutritional standards,
- To raise incomes of the rural population,
- To increase foreign exchange earnings,
- To produce and supply raw materials for the industrial sector,
- To ensure food security in the country, and
- To develop and introduce new technologies for productivity increase.

(2) Major Policies for Agriculture Sector

- Promotion of increased production by the private sector,
- Increasing exports,
- Liberalisation and rationalisation of production, processing and marketing, and
- Promotion of non-traditional crops production.

In the "Agriculture Policy of Tanzania 1996" (draft), the primary agriculture development targets are the national food balance and increased incomes of the rural population, and the similar objectives for agriculture development are set forth. At the regional level, the agriculture development is to be promoted in accordance with the national level development strategies and polices for the sector.

The expansion of food crops production through irrigation development envisaged under the present Project will surely contribute to attaining GOT's primary policy objectives for the agriculture sector: Attainment of food self-sufficiency in the country and income increase of rural population.

2.6 Government Objectives and Policies for Rural Development

GOT has repeatedly declared rural development as one of its priorities. There is a need to focus on development of rural areas as the majority of the country's population or 85 % of the total population live in these areas. The main development issue in these areas is poverty. Poverty prevails in most of these areas due to low income per capita, high mortality rates, low agricultural productivity, etc. All these problems lead to low standards of living of the majority of people in the rural areas. In the Rolling Plan and Forward Budget (1996/97 - 1997/98), the major objectives, policies and strategies for the rural development sector are set forth as follows:

(1) Major Objectives for Rural Development Sector

(a) Increasing food production,
(b) Creating a conducive environment and provision of production infrastructure to raise the living standards of rural people,
(c) Provision of basic needs such as health, education, potable water supply, and
(d) Improving the quality of life in the rural areas by providing employment and encouraging private sector's involvement in all sectors.

(2) Major Policies and Strategies for Rural Development Sector

(a) Policy: Increase of incomes and alleviate poverty;
(b) Strategies are:
  - Encouragement of private sector involvement,
  - Improvement of the extension services,
  - Improvement of accessibility to areas having agricultural potential,
  - Ensuring household food security, and
  - Facilitating establishment of rural credit societies and marketing of agricultural produce.
(c) Policy: Promotion of investment in economic and social infrastructures;
(d) Strategies are;
  - Construction and maintenance of village access roads,
  - Rehabilitation of the existing facilities for basic needs,
  - Emphasising on health prevention and immunisation programs,
  - Provision and delivery of social services to rural areas, and
  - Implementing cost recovery and user charges.

2.7 Government Objectives and Plans for Irrigation Development

Irrigation is a growing importance to Tanzania to make the country self sufficient in food production . Tanzania has about one million hectare potentially irrigable from surface water excluding underground water. But only 150,000 ha are under irrigation by small holder farmers, using 'run of the river' techniques (IBRD 1994). Other 25,000 ha are in large centrally managed by government institutions, NAFCO and sugar development corporations. The main objectives of irrigation in Tanzania are: (a) to improve food security, particularly in years with inadequate rainfall (b) to increase in small farmers productivity and income (c) to produce marketable high value crops.

The Agricultural Policy of Tanzania (1996, draft), states that (a) the government will focus its support on the development of small irrigation schemes, in areas of high potential and sufficient demand for irrigation facilities and will encourage the private sector to provide the necessary services in respect to pre-investment, scheme designs, construction and management of 'large scale' schemes using their own resources. Due consideration will be given to land conservation and environmental aspects (b) the government will provide assistance at the planning and designing of small holder irrigation schemes and supervision of construction. Actual construction works will be contracted to private entrepreneurs. The farmers/operators will be encouraged to form water users' associations for the management of their schemes. Construction costs born by the government will have to be repaid (partly) by the users, through cost recovery mechanism. The National Irrigation Development Plan (NIDP) which was launched in May 1994 also estates the similar strategies mentioned above.

3. THE KILIMANJARO REGION

3.1 Land and Population

The total surface area of Kilimanjaro Region is 13,309 Km^2 and this size corresponds to 1.4 % of the area of the entire country. About 23% is cultivated land 33%, grazing land and 35% is arid land including Mt. Kilimanjaro. The altitude of Kilimanjaro Region ranges from 700 to 5,895 meters above the sea level which causes the Region to be influenced by different rainfall patterns and hence to cultivate a variety of crops.

According to the census of 1988 the population of Kilimanjaro Region was 1,104 thousand and according to population projections the population in 1992 was estimated to be 1,202 thousand refer to Table F.3.1). The annual increase rate is comparatively low in this Region (1967-1978, 2.9 % and 1978-1988, 2.2%). The Highland Zone of Mt. Kilimanjaro and Pare (1,100-1,800 masl) has a density of population of about 650 people per Km^2 . Due to the high population pressure in the highland and decreasing size of farm per household , migration to low land have been increasing where rainfall is not reliable. The population pressure in the low land is increasing , and the measurements to improve the human carrying capacity of these areas are needed.

Administratively Kilimanjaro Region is divided in 6 Districts, i.e. Rombo, Mwanga, Same, Moshi Rural, Hai and Moshi Urban. They are sub divided into 25 Divisions, 104 Wards and 382 Villages.

3.2 Present State of Agriculture in the Kilimanjaro Region

Agriculture in Kilimanjaro Region has played an important role in both the national and regional economy. More than 75% of the population 10 years and above are engaged in agriculture. The Region is one of the main producer of cash crops in Tanzania and among them coffee is predominant. In 1992/93 about 14,500 tons of coffee was harvested.

The main cereal crops produced in the Region are maize, paddy, millet, wheat and sorghum. Beans, banana, sweet potato, cassava are also in big quantity. In recent years due to unfavourable weather the production of cereal crops has been decreased. In 1985/86 the cultivated area of paddy was 11,600 ha, which decreased to 6,000 ha in 1993/94 and the production was only 23,000 tons (refer to Table F.3.2). The area of maize, which is the main staple in the Region has been also decreased. According to the document of RALDO 1997, because of the draught, about 35% of the population in the Region were in food shortage and 9% of the entire population were totally unable to buy foods. Non availability of fodder and water affected the livestock production. Severely affected districts were Same, Mwanga, Lower Rombo, and a few pockets of Hai and Moshi Districts. About 5,400 tons of relief food were provided under World Food Programme (WFP) and from Strategic Grain Reserves.

According to the documents of Zonal Irrigation office (1994), there are about 28,000 ha of irrigated land in the Kilimanjaro Region (large scale 6,100 ha, traditional irrigation scheme, 19,115, ha and modernised small holder scheme, 2,980 ha) which corresponds to about 9% of the total cultivated area in the Region. Crops like coffee, banana, cardamom and fruits commonly use traditional canals.

3.3 Regional Agriculture and Rural Development Plans

The main objectives of Regional Agriculture Development Plan are: (a) to increase productivity of major food crops , such as maize, paddy, beans, bananas, coffee, cotton and sunflower (b) to increase livestock as well as dairy production (raising milk production from 6 litters per day to 7 litters per day) , to increase the average weight of cattle from 120 kg to 132 kg, to increase egg production from 50 to 70 per chicken.

To achieve the above objectives the basic approaches are: (a) training of extension staff (b) to insure availability of inputs through farmers organisations (c) encouragement of farmers group formation in which extension messages will be delivered (c) to encourage soil and water conservation and afforestation activities (d) to encourage traditional and modern farrows (e) to encourage NGO's to participate in extension activities (f) distribution of improved dairy cattle (g) to control animal disease etc.

In the Kilimanjaro Region Rolling Plan and Forward Budget, 1997/98 - 1999/2000 (KRPFB), the development objectives, policies and strategies for the sectors of administration, health, education, water, works (road construction), trade, lands, natural resources & tourism, community development, co-operatives and sports & culture are set forth. The major objectives for the water and works sector in the development plan are as follows:

(1) Major Objectives for Water Sector

- To provide adequate, clean and safe water by the year 2002,
- To identify and develop new water sources, and
- To improve efficiency in the development and management of water supply.

(2) Major Objectives for Works Sector

- To provide adequate efficient and effective transport services in the region.

The development funds allocated for KRPFB for 1997/98 are Tsh. 58 million for water sector and 44 million for the works sector. The budget allocation to each sector will be too limited to achieve the ambitious objectives. Therefore, the enhancement of agricultural productivity, through agricultural development in rural areas as envisaged under the Project, is the basic strategy for poverty alleviation or attainment of the ultimate objective of rural development.

3.4 Education

In Kilimanjaro Region there are 710 primary schools, 104 secondary schools (public 37, and private 67) and 3 teacher training colleges. Although the number of education facilities are considered sufficient they suffer from the shortage of instruction materials, class rooms, furniture etc. According to the census of 1988, literacy rate (5 years and above) was 71% for males and 66% for females compared to 68% and 51% in 1978 respectively. The first Farmer's Training Centre in Tanzania was established at Msinga (13 Km from Moshi Town) in 1962, which serves not only the Region but also the whole country.

3.5 Medical and Health Services

According to the Kilimanjaro Regional Statistical Abstract (1993), the Region has 12 hospitals, 12 rural health centres and 126 dispensaries. Health services are provided by government machinery as well as the private sector and religious institutions. Although the accessibility of obtaining medical treatment in the Region seems very good , the distribution of health facilities shows large disparity by area. There are many villages in the Region without dispensaries and health staff. Diseases commonly seen in the Region include, Malaria, Bilharzia (Schistosomiasis) Diarrhoea etc. Infant Mortality rate per 1,000 in 1978 was 76 and it declined to 67 in 1988. Under 5 mortality rate per 1,000 live births is reported at 104.

3.6 Transportation

The Kilimanjaro Region is relatively well served by a road net work which links major towns in the Region. A main artery of the Regional road network is the Dar es Salaam-Tanga-Moshi-Arusha highway and a highway branching from Tanga-Moshi highway at the Kilema Pofo, 23 Km west of Moshi town. Kilimanjaro Region has 2,792 km of roads of which 230 km are tarmac, 149 km gravel and 2,413 km earth roads. There are some rail roads in the Region which were constructed in the colonial period. The railway line from Tanga to Moshi was constructed in the German colonial period. The railway line is mainly used for freight transportation.

There is an international airport between the boarder of Kilimanjaro and Arusha Regions. In 1994/95 about 730 tons of flowers 470 ton of vegetables were exported through the airport (refer to Table F.3.3 and F.3.4).

3.7 Industries

Industries in Kilimanjaro Region can be identified as agriculture related industries, local consumer related industries and cottage industries. Most of the big industries which employ more than 100 people are mostly concentrated in Moshi. The most important industries are sugar, Coffee curing, match making industries. Local small industries are consumer oriented manufacturing or food processing units concentrated in urban areas. Products of this category are furniture, footwear, soap, gemstones, sweets etc. There are many cottage industries in the Region, based on local agricultural as well as non agricultural raw materials. Cottage industries are more numerous in rural areas than towns and usually employ family labour.

4. THE MOSHI DISTRICT

4.1 Land and Population

The total area of Moshi District is 3,131 Km^2 of which 3,054 Km^2 is rural and 77 Km^2 is urban. Moshi District is situated in Northern Tanzania, and borders Kenya to the North, Hai District to the West, Mwanga District to the South and Rombo District to the East.

According to the census of 1978 the population of Moshi District was 312 thousand for rural and 52 thousand for urban and in 1988 it increased to 343 thousand for rural and 97 thousand for urban. At a growth rate of 2.2% per annum which is comparatively low with the growth rate for the whole country (2.8%). In 1997, it is estimated that the population for Moshi rural is 394 thousand and for urban 109.8 thousand. Hence the total population between 1978 and 1997 increased by 139.3 thousand. The density of population varies with the ecological zone, where by the middle and upper belt zones are densely populated (650 people/Km^2). In the lowest belt, the density is 50 people per Km^2 .

4.2 Occupation and Employment

It is estimated that, about 95% of the population in Moshi District depend on agriculture for their living. However the resent occupation wise statistics of population is not available, according to the census of 1988 , about 70% of the population 10 years and above in Moshi rural areas who had occupation, were employed in agriculture sector, followed by industry and non specific work (craftsmen, small scale traders, labourers) 16.6%, and office and sales work 13.5%. On the other hand in Moshi urban areas, 37.6% of the population who had occupation, were employed in industry and non specific work followed by office and sales work 37% and agriculture 25%.

4.3 Present State of Agriculture in the Moshi District

The District produces various kinds of crops owing to its diversified climatic conditions. The lower zone (762-914 masl) produces maize, paddy, sorghum, beans, cotton, sunflower, and groundnuts. About 60% of the paddy producing area lies in this zone. The failure of crops in this zone affects not only the District but also the whole Region, but this is the zone which depends heavily on rain which is unreliable. The middle belt (915-1500 masl) produces, coffee, banana, maize, beans, vegetables and fruits. The main problem of this zone is soil erosion. The upper belt (1500-1800 masl) produces coffee, banana and vegetables. The main problem in this belt is coffee bearing disease (CBD).

According to the documents of District Agriculture Development Office (DADO), in 1996 the District had 83,000 farm households and per household land holding ranged between 0.4 ha and 1.0 ha. In 1996 the District produced staples like maize, paddy, beans, millet, 72,500 t, 37,000 t, 7,800 t, and 2,250 t respectively. Among cash crops, coffee 5,148 t, sunflower 1,500 t, cotton 119 t were produced. According to DADO, the general outlook of agriculture was satisfactory good in 1996/97, because of well distributed rainfall pattern together with absence of pests and diseases. According to the Moshi District food position report, owing to the good rainfall this year, there may arise some food surplus in next year.

In Moshi District there are some NGO supported programmes in the District, such as 'Trees and Tree Crop Nurseries, 'Rehabilitation of Traditional Furrows', 'Distribution of Dairy Cattle, 'Pig and Rabbit Distribution', 'Supply of Cereal Inputs' etc.

Major agricultural inputs are comparatively available in the District, but the main problems are the capacity of the farmers to buy the inputs. A previously bad weather will render a farmer unable to buy necessary inputs. The main problems presently faced by the farmers are pointed out as (a) single source of income which is affected by weather conditions of the season (b) absence of farm credit services (b) fluctuating prices of inputs etc.

4.4 Livestock Production

Livestock keeping is general phenomenon in the District for supplementary income and for supply of diary products and meat. It is regarded as a resource of wealth and an insurance against crop failure or any other problems. In the upper belt and middle belt livestock is kept mainly indoors, while in the lower zones, grazing is practised. According to the District Agriculture Development Office DADO) in 1996, the population of goats was big in numbers (127,232), followed by cattle (124,473) and sheep (54,870). It is estimated that the population of dairy cattle have been increased by about 6% between 1984 and 1996, but there is no significant change in the numbers of other livestock during the same period.

4.5 Agricultural Marketing

The marketing system of all agricultural products have been fully liberalised. The marketing of food crops including vegetables, fruits and livestock products is dominated by private small traders. Agricultural marketing is characterised by a very large number of small traders who operate both from and outside the Study Area including Moshi, Arusha and other parts of the country. The procurement at village level is typically direct contact between traders and farmers. Majority of the farmers sell paddy to the middlemen immediately after harvest. Modern standard measures are not in practice. In the Study Area individual farmers and individual traders, are making deals with small volumes and price determination occurs by means of bargaining . Farmers negotiate price to the size of bag brought by the middlemen and sometimes middlemen generate more profit by using over compacting technique when filling the bags which they bring with them.

In case of paddy/rice marketing system, a large number of small traders operates between the farmers and rice mills. Some local farmers are also the traders. Traders buy paddy directly from the farmers and take it to the mill and after milling it, sale to the local retailers or inter-regional traders. There are also many farmers who sale to the traders in the same manner. In case of marketing of maize small traders buy maize directly from the farmers and bring it to the main markets respectively. The exact volume of agricultural and livestock products exported from the Study Area is difficult to verify statistically, because there is no record. According to the traders of Moshi markets, about 70% of rice comes from Lower Moshi area. The flow of agricultural products are shown in Figure F.4.1.

In the Study Area there are two minor markets, that in Chekereni, and Oria which are opened once a week and most of the local agricultural products are sold there. Some retailers from the markets of Moshi municipality contact those markets for vegetable and other food grains collection. Some periodical markets are shown in the following Table.

Name of the Market[1]	Opening Day	Major Commodities Sold	Supply Source	Buyers Coming From
Oria (Inside the Study Area)	Friday	Agricultural Products, Fishes and other Daily use Commodities	Mainly from the Study Area	Middlemen from Moshi and Local Farmers
Chekereni (Inside the Study Area)	Monday	Agricultural Products, Fishes and other Daily use Commodities	Mainly from the Study Area and Moshi Town	Middlemen from Moshi, Farmers from the Study Area, TPC
Kiboriloni (Near Mandaka Monono Village) [2]	Wednesday and Saturday	Agricultural Products, Fishes and other Daily use Commodities	Mosi, Arusha, and from the Study Area	Mosi, Arusha, and from the Study Area, Sometimes Middlemen from Dar es Salaam etc.
Himo (23 km from Moshi Town) [3]	Monday and Thursday	Agricultural Products, Fishes Clothing, Footwear and other Daily use Commodities	Rombo, Dar es Salaam, Arusha, Moshi etc.	Middlemen from Rombo, Dar es Salaam, Arusha, Moshi and sometimes from Nairobi (Kenya)

Note: 1) Such kinds of weekly or periodical markets in the Study Area appear and disappear frequently
2) This is a comparatively big market with about 900 sellers and Majority of farmers of Mandaka Monono sell their products in this market. Big portion of rice sold here comes from the Study Area
3) This is a big market with about 2,000 sellers and here too big portion of rice comes from the Study Area

In Moshi city local petty traders have been found in many localities. There are eleven comparatively big markets in Moshi city. The daily buying of fresh vegetables by most consumers in the local markets is the prominent feature of vegetable marketing. The lack of refrigerator in majority of households is the main reason for daily buying. The main supply destination of agricultural products in the Study Area are the markets in Moshi municipality.

4.6 The Moshi Central Market

It is a retail market . Either farmers themselves bring the commodities to the market and sell it to the retailers or retailers/jobbers go to the farmers and bring the products for retailing as described above. Commodities sold in the market are rice, maize, meat, fish, beans, peas, tomatoes, amaranth, cabbages, onions, carrots, pepper etc. Fruits including ripe bananas, orange, lemons, avocado, pears, are also available but are sold along with other commodities.

Every retailer pays 3,000 Tsh. to the local government per month and occupy spaces not greater than 2 m^2. The local government is expected to provide services such as cleaning, setting disputes, security to the commodities at times when the market is not operating. The prices are determined through bargaining. There are altogether 113 permanent retailers in the market and there are 62 temporary traders who sell some commodities occasionally. In the whole Moshi municipality there are altogether 1,491 small traders dealing with agricultural and livestock products.

There is no cold storage facility and all unsold perishable commodities such as meat, fish, vegetables and fruits are usually thrown to the garbage.

Rice is sold in a retail price on the market. According to the market sources, more than 70 percent of the rice at the market comes from Lower Moshi area. Other supply sources of rice are Kihurio, Ndungu, Kisiwani, Kirya and Magugu in Arusha. Retailers usually go to the farmers, purchase paddy at a negotiable price and then they mill the paddy into rice and then sell at a retail price using a can of about 1 kg as a standard measure.

There are also butchers in the market. Livestock is sold through the free market system as described before. Farmers sell live animals to the slaughter houses which are managed by the villagers themselves. In Moshi municipality it is managed by the town authority. Butchers buy cattle from livestock markets like Weruweru, Uchira, Lokii (Arusha) etc. slaughter them in the slaughter houses and bring the meat to the market for selling. Chickens are also sold in the market alive. The prices of meat are usually set by the butchers by agreeing with each other but the prices of chicken is negotiable. As mentioned before it is statistically difficult to estimate the total volume and amount of commodities transacted in the market because no any record of transaction is available.

The markets of Moshi do not have adequate place to sale fruits and vegetables. The whole market becomes more dirty during the rainy season. Drinking water, toilets, wastage removal, electricity, security etc. can be pointed out as the main problems. In the market grading is not common practice and the packing practices are traditional. Modern weighting systems are not introduced and most of the traders use various sizes of cans as mentioned before.

4.7 Marketing of Agricultural Inputs

GOT started to phase out the subsidy on fertilisers from the late of 1980's and completely stopped from 1994/95. The move and the regular devaluation of Tsh to US dollars sparked off extreme rise in prices of inputs. In 1990, GOT liberalised the seed industry so that private sector was allowed to entry into the production, distribution and marketing of seeds. The marketing systems of both agricultural , livestock commodities and inputs have been fully liberalised. Government roles are confined to provision of market information , monitoring of market performances, quality control, research and promotion etc. Most of the inputs which are imported from foreign countries by authorised institutions or individuals, are acquired from different sources. The main authorised institutions in the Moshi area are TFA, TCB and KNCU. There are private companies who import directly from foreign countries or buy from the main suppliers and sell it in retail. Farmers in and around the Study Area obtain inputs, and other agricultural tools from rural shop known as "Uwanja Wa Mbuni Farmer's Shop" in Chekereni and other shops in Mabogini. Some farmers purchase from private stockists or purchase from the dealers in Moshi municipality. The main problems faced by farmers are pointed out as high prices with fluctuations in the market over short time periods and wide seasonal variations.

5. THE STUDY AREA

5.1 Demographic Situation of the Study Area

According to the population census of 1988 the total population of the Study Area was 21,004 with 4,302 households. The annual growth rate in the District was estimated at 2.2%. In 1997, the estimated population of the Study Area is 25,540 based on the annual rate of population increment at 2.2%. The population figures are shown in the following Table.

Village	Population		LMP Area	Exp. Area	New Ext. Area
	1998	1997			
Mabogini	4,105	4,990	3,330	-	1,660
Rau Ya Kati	1,695	2,060	2,060	-	-
Chekereni	2,851	3,470	1,910	-	1,560
Oria	3,783	4,600	4,600	-	-
Mandaka Monono	1,444	1,760	-	1,760	-
Kaloleni	2,568	3,120	-	3,120	-
Mtakuja	2,713	3,300	-	-	3,300
Mvuleni	1,845	2,240	-	-	2,240
Total Population	21,004	25,540	11,900	4,880	8,760
Total Households	4,302	5,218	2,145	1,234	1,839
Family Size	5.0	5.0	5.6	4.0	5.0

Source: Figures for 1988 are from Population Census (1988), and figures for 1997 are Estimated
Note: LMP Area: Existing Lower Moshi Project Area; Exp. Area: Expanded Area and New Ext. Area: New Extension Area.

As the above Table shows, about 47% of the population are in the Existing Lower Moshi Project Area, 34% in the New Extension Area and 19% in the Expanded Area.

5.2 Socio-Economic Condition of the Study Area

5.2.1 Mabogini Village

Mabogini village is composed with 10 sub villages which include, Bojini Juu, Kijijini, Shabaha, Shule, Harusini, Rau Msufini, Sanya Line A, Sanya Line B, Mpirani and Mjohoroni. The Majority of the people are from Pare, Chagga, Sambaa tribes. Most of the people are engaged in agriculture and the main products are maize and paddy. Paddy is mainly sold from the field after harvest and maize is stored in the house and sold when the prices rise as described before. Other economic activities in the village are small trade i.e., buying and selling of cereal crops, operation of small shops, bars, and mills, farm labour etc.

There is a Primary School with 1,032 pupils and 26 teachers. And there are two kindergartens managed by Roman Catholic Mission and Muslim Association (BAKWATA). There is a government run dispensary established in 1972 with 10 beds and there is a Tropical Pesticides Research Institute (TPRI) established in 1972. It carries research on bilharzia and malaria which are rampant in the area. Tap water is available but not longer adequate, and in the dry season people use water from canal and wells. Many passenger buses shuttle through the village and transportation is comparatively available. According to the hearing survey with the village officials, there is a plan to extend class rooms of the primary school every year since 1991 (only 3 class rooms have been built), and construction of village office building is going to be completed. Irrigation is the most priority demand of the villagers.

5.2.2 Rau Ya Kati Village

The village is composed with 5 sub villages, Rau Kati, Rau Msufini, Mkonga, Lembeni and Mwisho Wa Shamba. The majority of the people are from the tribe of Chagga and Pare. About 95% of the population are engaged in agriculture. The main products of the village are maize, paddy and some beans. Some vegetables like cabbage, okra etc. are produced for self consumption. There are some minor economic activities like small trade, shops, bars, farm labour etc.

There is a primary school in the village with 546 pupils and 19 teachers and there is a kindergarten run by the village. There is no dispensary in the village, and the villagers generally use the dispensary in Mabogini village or in Chekereni village. Tap water is available only periodically and they generally use the water from canals. Transportation services from the village is not available and they use the services from Mabogini or Chekereni villages. According to the hearing survey with the village officials the office building of the village is going to complete in near future and they have applied for a dispensary in the village. The first priority demand of the village is irrigation followed by drinking water, dispensary and electricity.

5.2.3 Chekereni Village

The village of Chekereni is composed by 8 sub-villages, Makao, Makuu, Chekereni, Majenjo, Kibosho A, Kibosho B, Mwamko A, Mwamko B and Mtaa Wa Wa-Uru. The majority of the population are from Chagga tribe followed by Pare and Sambaa. About 90% of the villagers are engaged in agriculture and the main products are maize and paddy. Other economic activities in the village are the operation of small shops, small trades. There are 12 individually operated daily use commodity shops, 2 farmers' association operated shops and one Village Committee operated shop. KATC and KPHC are located in this village and some people are getting employment here.

There is one primary school in the village with 949 pupils and the number of teachers is 25. According to the village officials about 95% of the villagers (over 5 years old) are literate. There is a dispensary operated by Roman Catholic Mission with 15 beds and one is operated by BAKWATA. Transportation is comparatively comfortable in this village with bus services to Moshi Municipality. According to the village officials, there are several development plans such as, construction of guest house (1998), extension of 4 classrooms of primary schools (until 2000), establishment of a secondary school (date not specified), construction of village shopping building (nearly complete) and rehabilitation of traditional canals of 4,750 m (date not specified). The most need of the village is pointed out as irrigation.

5.2.4 Oria Village

The majority of the villagers are from Pare tribe followed by Chagga and Kahe. This village is composed by 9 sub villages, Mwisho Wa Sambaa, Kwa Ginja, Ng'ambo Ya Reli A, Ng'ambo Reli B, Mkongeni, Stesheni, Kizungo and Mkonga. Previously Pare tribes used to keep bees, but recently they have shifted to agriculture. And about 95 % of the population are engaged in agriculture and the major products are maize and paddy. There are no other significant economic activities in the village except small shops (about 30) and farm labour. About 30 people from the village work in NAFCO.

There is one primary school with 447 pupils and 14 teachers and one secondary school with 37 students and 5 teachers in the village. There is no dispensary in the village and periodically, the Red Cross and BAKWATA provide some first aid. The villagers generally use the dispensary in Chekereni or hospital in TPC. There is a tap water piped in from Moshi, however it hardly flows to Oria any longer because the same main pipe also supplies Mabogini, Rau Ya Kati and Chekereni where there has been an increase in using tap water in paddy. There are 3 buses which shuttle from village to Moshi municipality twice a day. According to the hearing survey with village officials the village has a rehabilitation plan for road which has been already started and will be continued every year and their needs are irrigation followed by drinking water, dispensary and rehabilitation of roads.

5.2.5 Mandaka Monono Village

About 75% of the population of the village are from Chagga tribes followed by Sambaa and Pare. The village is composed of sub villages Monono Kati, Mwanagaruwe, Mawanamasota, Uswahilini and Samingo. Most of the people are engaged in agriculture and main products are maize and paddy. There are only 6 daily use commodity shops in the village and there are no any other significant economic activities in the village. There is no any schools in the village and children attend schools in Mabogini or Masaranga villages. And there is no dispensary in the village and villagers use dispensaries in nearest village or go to Moshi municipality. Water for domestic use is fetched from a spring named Mwanaguruwe and other small springs which are located in private farms. However the village has fair weather road, there is no public transports in the village and traders hire private trucks for the transportation of agricultural products.

According to the hearing survey with the village officials the village has a plan to establish a dispensary (date not specified), and from July 1997 rehabilitation of road has been started and there is a plan to install a toll gate for tax collection from trucks (500 TSh for 5 ton or below vehicles and 1,000 TSh for more than 5 tons) , carts and motorcycles (200 TSh) and bicycles (50 TSh). The priorities of need are water management technology (for proper use of spring water and water management), dispensary, establishment of primary school, bridge over Rau River to Mabogini and rehabilitation of roads.

5.2.6 Kaloleni Ward

Kaloleni is one of the Wards of Moshi municipality. The majority of the people are from Pare tribe followed by Sambaa and Chagga. The percentage of population engaged in agriculture is comparatively low in this Ward (about 35- 40%, based on hearing survey) and remaining others are traders or labourers. The main products of this Ward are paddy and beans. Maize cultivation is prohibited in this Ward (because maize fields became the hiding place for the thieves) when it became municipality. There is a primary school in the Ward and the number of pupils is 652 with 18 teachers. There is one secondary school managed by Muslim Association with 50 students and 4 teachers. There is no government dispensary in the Ward and people use the hospitals in Mosi municipality.

According to the hearing survey with the Ward officials, the Ward has plans for construction of office building in 1998, to erect a police station (date not specified), construction of a bridge over railway line in 1998. The priority needs of the Ward according to the Ward officials are protection of spring from floods and establishment of a dispensary.

5.2.7 Mtakuja Village

The village of Mtakuja is composed of six sub villages, Mbatini, Upareni, Rizavu, Josho, Mafuriko and Mbeya Kuwa. The main tribes of the village are Arusha, Chagga, Pare and Masai. According to the hearing survey, about 70% of the villagers are engaged in agriculture , 20% are pastoralists and remaining others are labourers. All of the pastoralists are from Masai tribe. Their cultural and social heritage is bound to the livestock. Large numbers of livestock is the symbol of wealth and social status. The main agricultural production of the village is maize. From July 1997 a weekly market has been opened in the village where agricultural products, livestock and other daily use commodities are sold. There are no other significant economic activities other than agriculture , livestock production and labour works.

There is a primary school and a pre primary school and a school for disabled is under construction. In primary school there are 350 pupils with 13 teachers. There is a dispensary with 4 beds. Drinking water from tap is not sufficient and villagers fetch water from canals and sallow wells. The village has started to construct a well for drinking water from 1984, and due to the lack of fund it has yet not been completed. According to the hearing survey with village officials the priority needs of the village are irrigation and drinking water.

5.2.8 Mvuleni Village

The village is composed with six sub villages, Uhuru, Utamaduni, Ujamaa, Muungano, Usalama and Mapunduzi. The majority of the people are from Pare, Sambaa and Chagga. More than 95% of the population are engaged in agriculture and the main product is maize. About 1% of the population work in TPC. There are 10 small shops in the village which sale daily use commodities. There are no any other significant economic activities in the village other than agriculture and labour works. There is one primary school in the village and the number of pupils and teachers is 337 and 12 respectively. There is no health facility in the village. There is one tap water but it is not sufficient and villagers fetch water from canal and sallow wells. In 1988 the village formulated a plan to dig three wells for drinking water but due to the lack of fund it has not yet been started. The priority demand of the village is irrigation, which will generate more income and they will be able to consume rice which is eaten only few times during a year. Demand of irrigation is followed by drinking water and dispensary.

6. FARM ECONOMY

6.1 Farm Management Size

The farming system in the Study Area is characterised by small individually owned farm and by cereal crops production. According to the farm interview survey (1997), the average total cultivated land per household is 1.6 ha in the Existing Lower Moshi Project Area, 1.5 ha in the Expanded Area and 1.54 ha in the New Extension Area. The reported sizes of irrigated farmland vary in the range of 0.2 to 4.8 ha in the Existing Lower Moshi Project Area, and from 0.2 to 2.4 ha in the Expanded Area. The average size of irrigated land per household in the Existing Lower Moshi Project Area is 0.61 ha and that in the Expanded Area is 0.75 ha.

According to the farm interview survey (1997) results, some 60% of the sampled households in the whole Study Area cultivate less than 2 ha. At the other extreme end, only 8% of the sampled households hold land above 5 ha. In the Existing Lower Moshi Project Area, the majority of the farmers (about 70%) hold land not exceeding 2 ha and an insignificant number of farmers (2.5%) hold land above 5 ha. In the Expanded Area, the majority of the sampled households (55%) hold land less than 2 ha, while about 15% of the sampled households hold more than 5 ha. In the Extension Area, the land holding size is similar to that in the Expanded Area, i.e. about 50% of the sampled households hold less than 2 ha, and at the other extreme, 15% of the sampled households hold 5 ha and above (refer to Table F.6.1).

6.2 Land Tenure System

The main land ownership in Tanzania is either held through Customary Law or Leased under 'Right of Occupancy'. According to Land Ordinance Chapter 113 of 1959 and amended in 1974, land in Tanzania is a public property and no individual has a right to own land. Instead the government grants the 'Right of Occupancy' to the user for a given time, normally 33 or 99 years but subject to renewal. According to the hearing survey with the Village officials in the Study Area, the dominant land tenure system is 'Customary'. In the Study Area agricultural land was distributed to farmers by Local/Tribal Chiefs before the Chief-dom was abolished in 1963. After the abolition of Chief-dom, the land had been distributed by the Village Development Committee. Such holdings are also considered under Customary Law. Land held under 'Customary Law' does not have term limit. Such land belongs to the family head and it is handed down to male children when they are grown up, when they are married or when the head of the family (father) dies. The government does not interfere with such land held under 'Customary Law'. The land held under 'Customary Law' can be sold with the permission of clan members and notification to the Village authority. According to the National Land Policy, 1995 (document of the Ministry of Lands, Housing and Urban Development), a dual system of tenure which recognises both customary and statutory rights of occupancy as equal in law will be established and 'Right of Occupancy' shall include all rights over land acquired through Customary procedures. And Land held under 'Customary Laws' shall have no term limit. The Land Policy document further elaborates that, 'Customary Right of Occupation' will be conformed by *Hati Ya Mila* (land certificate) which will be issued by the Village Council and registered at the corresponding District Land Registry.

The land is inherited by the sons in the family as described before. Due to such kind of land inheritance system, recently fragmentation has emerged as a serious problem. In the Study Area, there exists some communal land in Chekereni , Mvuleni , Oria , and Rau Ya Kati . This type of land belongs to the whole village are cultivated collectively or rented out or are used as common grazing land. Sometimes there arise some tenure problems in Mtakuja and Mvuleni villages between livestock owners (mostly pastoralists) and farmers. This problem especially arises in and around the communal grazing land.

6.3 Prices of Farm Products and Inputs

6.3.1 Market Prices of Farm Products

Most of the controls on the marketing and transportation of food grains were liberalised in 1989 and producer prices in agriculture were freed between 1992 and 1993. Private marketing of major traditional export crops was officially allowed in 1993. Input subsidies were phased out. The marketing systems of both agricultural , livestock commodities and inputs have been fully liberalised. Government roles are confined to provision of market information and monitoring of market performances.

(1) Buying Prices and Selling Prices

The main supply source of Moshi municipality is Lower Moshi area. As mentioned above, more than 70 percent of the paddy/rice comes from the Existing Lower Moshi Project Area. Other commodities like vegetables, fruits come from Moshi and other regions of the country like, Same, Dodoma, Singida, Tanga, Arusha etc. (refer to Table F.6.2). According to the hearing survey, the differences of buying prices and selling prices of staples, like paddy and maize is more than 25 percent, while other commodities ranges from 10 percent to 500 percent (refer to Table F.6.2).

(2) Price Fluctuations in the Market

The prices of the agricultural commodities in the Moshi markets experience extreme fluctuations over short time periods and wide seasonal variations. The prices of staples, like paddy and maize show extreme fluctuations. In June 1996 the price of paddy per bag was 12,000 TShs while it was more than 18,000 TShs in April 1997, hence it fluctuated by more than 50 percent (the prices of paddy mentioned here are for the Lower Moshi Area). The lowest price of paddy during the harvesting season or May/June (12,000 TSh/bag), and highest in April (18,000-20,000 TSh/bag). In case of maize the lowest price was in September (6,000-6,500 TSh/bag) and highest in April (15,000 TSh/bag). The prices of other vegetables, fruits, meats etc. also show extreme fluctuations over short time periods and seasonal variations (refer to Table F.6.3).

6.3.2 Market Prices of Farm Inputs

From the late of 1980's GOT started to phase out the subsidy on fertilisers and from 1994/95 on, it was completely stopped. The move and the regular devaluation of TSh. to US dollars sparked off extreme rise in prices of inputs. In 1990 GOT liberalised the seed industry so that private sector was allowed entry into the production , distribution and marketing of seeds. GOT now focuses on certification, quality control, training, research and promotion. The prices of some agricultural inputs are shown in Table F.6.4). As shown in the Table , within about two years, the prices of chemical fertilisers increased between 2.8% and 75%. In case of herbicide, the price of 24. D Amine has been increased by about 82% followed by Gramaxone 51% and Round Up 17%, where as the prices of Stomp, Fenamine and Touch Down have decreased. The prices of many pesticides, fungicides and hand tools have increased. Because of such kind of price fluctuations , high prices and unreliable rainfall, small farmers tend to produce less risky crops like traditional variety of maize which is also less profitable.

6.4 Crop Budget

Crop budget for each area are calculated from the view point of farmers and are summarised below. For details refer to Tables F.6.5 and F.6.6. Costs and benefits for each crops are calculated under with and without project conditions. As the following Table shows, paddy is the most profitable crop in the area and farmers are motivated to cultivate paddy more and more if irrigation water becomes available. Net income obtained from paddy cultivation from one hectare of land comes more than 800 thousand which is more than 6 times with that of maize cultivation.

(Unit: Tsh/ha)

Particulars	Existing Lower Moshi Project Area	Expanded Area	New Extension Area[4]
Without Project			
(1) Paddy [1]			
Dry Season			
Gross Income	1,155,000	787,500	-
Production Cost	305,050	186,950	-
Net Income	849,950	600,550	-
Rainy Season			
Gross Income	-	612,500	-
Production Cost	-	170,750	-
Net Income	-	441,750	-
(2)Maize [2]			
Gross Income	230,000	230,000	138,000
Production Cost	92,700	92,700	69,200
Net Income	137,000	137,000	68,800
With Project			
(1) Paddy			
Dry Season			
Gross Income	1,225,000	1,137,500	1,225,000
Production Cost	317,450	304,550	317,450
Net Income	907,500	832,950	907,500
Rainy Season			
Gross Income	1,137,500	1,050,000	1,137,500
Production Cost	304,550	298,250	304,550
Net Income	832,950	751,750	832,950
(2)Alfalfa [3]			
Gross Income	105,000	105,000	105,000
Production Cost	59,500	59,500	59,500
Net Income	45,500	45,500	45,500

Note: 1) Figures for the Existing Lower Moshi Project Area are for the whole season average
2) Maize cultivation is not recommended under the project condition
3) Presently Alfalfa is not cultivated in the Study Area
4) Presently, paddy is not cultivated in the New Extension Area
Source: Farm Interview Survey (1997) and hearing survey with the farmers and extension workers

Crop budget in economic prices from the national point of view are also calculated and are shown in Tables F.6.7 and F.6.8. Prices of inputs and products are estimated based on the projected international market prices forecast by IBRD in 1997 current US$. Those figures are used to evaluate the viability of the proposed project by estimating economic internal rate of returns (EIRR). For details refer to Annex P.

6.5 Farm Household Budget

The income of the households in the Study Area, presently, there are a lot of variations from village to village and between crops grown. At present condition, the important source of income in the whole Study Area is agriculture, however households in the New Extension Area generate more income from non agricultural activities. With project condition (with paddy cultivation) the share of agricultural income will increase and total net reserve will be realised at more than one million Tsh per annum. The estimated net reserve under with project condition is highest for the Existing Lower Moshi Project Area (1.4 million Tsh) followed by the New Extension Area (1.2 million Tsh), and the Expanded Area (1.1 million Tsh). The estimated household income and expenditure are summarised below.

(Unit: Tsh)

Particulars/Area	Existing LMP Area		Expanded Area		New Extension Area		Study Area Whole	
	With Project	Without Project	With Project	Without Project	With Project	Without Project	With Project	Without Project
(1)Household Size	5.6	5.6	4.0	4.0	5.0	5.0	5.0	5.0
(2)Average Farm Size (ha)								
Paddy Land	1.63	0.60	1.50	0.75	1.54	0.0	1.56	0.45
Upland	0.0	1.03	0.0	0.75	0.0	1.54	0.0	1.11
(3)Income Structure								
Net Farm Income	2,111,922	684,341	1,765,988	656,490	1,995,571	105,952	2,021,487	482,261
Homestead Income	12,555	12,555	61,260	61,260	34,825	34,825	36,213	36,213
Livestock Income[1]	83,000	83,501	178,000	178,400	43,000	43,755	101,333	101,885
Non-Farm Income[2]	130,000	290,993	221,000	383,850	153,000	521,350	168,000	398,731
Total Income	2,337,477	1,071,3901,	2,226,248	1,280,000	2,226,396	705,882	2,327,033	1,019,091
(4)Living Expenditure	915,800	854,668	1,078,000	950,321	1,003,000	675,617	998,933	826,869
(5) Net Reserve	1,421,677	216,722	1,148,248	329,679	1,223,396	30,265	1,328,100	192,222

Note: 1) In the Project Area it is considered that the population of livestock will not increase, because: (a) grazing land will decrease (b) pastoralists will be encouraged to migrate from the Project Area.
2) The non-farm income is expected to fall after the implementation of the Project, because upland will be converted to paddy land which will require more labour, thus less time for non-farm works. It is estimated that in the Existing Lower Moshi Project Area, Expanded Area and New Extension Area the non-farm income will decrease by 55%, 42% and 70 respectively.
3) The estimate of farm income with Project Condition is based on the cropping intensity of paddy 150% and alfalfa 20%.

Source: For Farm Size, Income and Expenditure, Farm Interview Survey (1997), Hearing Survey with the Extension Officers and Village officials. For Family Size, Population Census, 1988.

6.6 Agricultural Labourers

Seasonal unemployment is common phenomenon in the study Area, however Labour shortage is experienced during planting, weeding and harvesting seasons. Comparatively big farmers in the Study Area hire labourers. The estimated labour force are summarised in the following Table. Per household available agricultural labour ranges from 1.7 to 2.4 persons. In the whole Study Area it is 2.1 persons per household.

Labour	Existing Lower Moshi Project Area	New Extension Area	Expanded Area	Project Area Whole
Agricultural Labour No.	4,977	3,660	2,038	10,675
Per Household Agricultural Labour No.	2.4	2.1	1.7	2.1

Note: Age wise labour ratio is based on the Statistics of Kilimanjaro Region (Kilimanjaro Region Statistical Abstract 1993) and in the Study Area 90% of the total labour force were estimated as agricultural labourers which is based on hearing survey (1997). 3 child labour (10-14 years old) is calculated equivalent to 2 adult labour).

Tables

Table F.2.1 Population Size by Region in 1967, 1978 and 1988

(in Thousand Tsh.)

Description		1967	1978	1988
Mainland		11,958.7	17,036.5	22,533.8
	Dodoma	709.4	972.0	1,237.8
	Arusha	610.5	926.2	1,351.7
	Kilimanjaro	652.7	902.4	1,104.1
	Tanga	771.1	1,037.8	1,283.6
	Morogoro	682.7	939.3	1,222.7
	Coast	428.0	516.6	638.0
	Dar es Salaam	356.3	843.1	1,360.9
	Lindi	419.9	527.6	646.6
	Mtwara	621.3	771.8	889.5
	Ruvuma	395.4	561.6	783.3
	Iringa	689.9	925.0	1,208.9
	Mbeya	753.8	1,079.9	1,476.2
	Singida	457.9	613.9	791.8
	Tabora	502.1	817.9	1,036.3
	Rukwa	276.1	451.9	695.0
	Kigoma	473.4	648.9	854.8
	Shinyanga	899.5	1,323.5	1,772.5
	Kagera	658.7	1,009.8	1,326.2
	Mwanza	1,055.9	1,443.4	1,878.3
	Mara	544.1	723.8	970.9
Zanzibar		354.8	476.1	640.6
Total		12,313.5	17,512.6	23,174.3

Source: Bureau of Statistics, Planning Commission, Statistical Abstract, 1992

Table F.2.2 Number of Persons Ages 10 Years or Above by Employment Status and Industrial Activity (1990/91)

Industry	Paid Employees	Self Employed	Unpaid Help	Total	Per cent
Agriculture: traditional	-	-	-	9,086,122	83.4
others	58,916	9,386	9,635	77,937	0.7
Mining and quarrying	3,195	99,624	-	102,819	0.9
Manufacturing	114,745	119,017	5,179	238,941	2.2
Electricity, gas, water	12,288	-	-	12,288	0.1
Construction	70,195	20,210	1,244	91,649	0.8
Trade	141,973	507,738	41,677	691,388	6.3
Transport and Communication	91,617	15,816	1,629	109,062	1.0
Finance	23,919	465	-	24,384	0.2
Service	416,510	35,082	3,023	454,615	4.2
Total	933,358	807,338	62,387	10,889,205	100.0

Source: Statistical Abstract, 1994, Bureau of Statistics, Planning Commission

Table F.2.3 Gross Domestic Product at Factor Cost by Industrial Origin at 1985 Prices

(Unit:Million Tsh.)

Industry	1985	%	1990	%	1994	%	1,995	%
Agriculture, hunting, forestry and fishing	51,634	50.8	66,084	49.8	83,638	53.6	89,466	54.9
Mining and quarrying	333	0.3	428	0.3	1,360	0.9	1,441	0.9
Manufacturing	9,772	9.6	12,038	9.1	10,593	6.8	10,487	6.4
Electricity and water supply	980	1.0	1,196	0.9	1,708	1.1	1,783	1.1
Construction	2,761	2.7	8,483	6.4	5,972	3.8	4,584	2.8
Wholesale and retail trade, restaurants and hotels	14,195	14.0	17,107	12.9	21,046	13.5	22,237	13.6
Transport, storage and communication	7,021	6.9	7,732	5.8	8,796	5.6	9,613	5.9
Finance, insurance, real estate	6,059	6.0	7,684	5.8	9,750	6.3	10,530	6.5
Public Admin. and other services	10,735	10.6	14,237	10.7	15,932	10.2	15,859	9.7
Less: imputed bank services	1,806	1.8	2,174	1.6	2,854	1.8	2,997	1.8
GDP at factor cost	101,684	100.0	132,813	100.0	155,941	100.0	163,003	100.0

Source: Bank of Tanzania, Economic Bulletin, September, 1996, Vol XXIV No.3 p.41

Table F.2.4 Annual Growth of Gross Domestic Product at 1976 Constant Prices (in Percent)

Year	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94
Agriculture, Forestry, Fishing and Hunting	1.0	1.3	2.9	4.0	6.0	5.7	4.4	4.5	4.6	6.6	9.5	3.5	6.9	0.4
Mining and Quarrying	2.1	0.0	-9.8	6.9	-6.5	-11.5	-3.2	-7.4	3.6	25.9	30.6	32.3	-14.8	-1.1
Manufacturing	-11.2	-3.3	-8.7	2.7	-3.9	-4.0	4.5	7.1	7.7	-2.5	11.5	4.3	2.1	-3.8
Electricity and Water	4.3	0.7	-1.7	6.3	5.0	18.0	7.4	-1.7	-29.3	26.4	13.6	-3.9	3.6	-2.8
Construction	-4.5	4.5	-41.0	20.2	-8.9	17.3	49.2	11.9	-19.2	67.2	0.6	37.7	12.0	6.9
Trade, Hotel and Restaurants	-4.0	-2.1	-2.1	1.1	18.4	-0.9	3.9	2.6	9.4	-1.1	5.4	3.1	4.8	-0.6
Transport and Communication	-9.1	2.5	-13.0	0.6	1.8	-0.3	5.6	3.5	12.7	-3.4	1.0	9.9	5.7	4.1
Finance, Insurance, Real Estate	1.9	6.8	4.3	5.9	2.1	8.9	0.4	3.1	3.5	2.1	0.9	3.0	3.5	4.3
Public Admin and other Services	11.4	0.1	-0.3	0.1	1.9	-10.8	0.6	3.1	3.9	2.8	2.0	1.7	-2.2	2.5
Imputed Bank Services Charge	3.4	21.5	7.3	5.4	5.6	11.2	-2.7	6.7	3.3	40.8	26.5	38.5	16.1	-22.2
GDP at Factor Cost	-0.5	0.6	-2.4	3.4	4.6	1.9	4.9	4.1	4.0	4.5	5.7	3.5	4.2	3.0
Indirect Taxes Less Subsidies	-10.6	-9.0	24.0	16.1	-8.6	17.9	5.7	1.9	0.3	7.2	-10.5	-16.8	-3.2	12.4
GDP at Market Prices	-1.6	-0.4	0.1	4.8	2.9	3.7	5.0	3.8	3.5	4.8	3.7	1.3	3.5	3.8
GDP Per Capita at Factor Cost	-3.6	-2.6	-5.4	0.1	1.3	-1.3	1.6	0.8	0.7	1.2	2.6	0.5	1.0	0.1

Source: National Accounts of Tanzania, 1976-1994, Bureau of Statistics, 1995

Table F.2.5 GDP Per Capita at Factor Cost at 1976 Constant Price

Year	Per Capita GDP (Tsh.)	Growth in Percent
1980	1294.7	-
1981	1247.7	-3.6
1982	1215.6	-2.6
1983	1149.6	-5.4
1984	1151.0	0.1
1985	1166.0	1.3
1986	1150.5	-1.3
1987	1169.0	1.6
1988	1178.0	0.8
1989	1186.2	0.7
1990	1199.9	1.2
1991	1231.2	2.6
1992	1237.5	0.5
1993	1249.7	1.0
1994	1251.3	0.1

Source: National Accounts of Tanzania 1976-1984
Bureau of Statistics, 1995

Table F.2.6 Area, Production and Yield of Principal Crops in Tanzania Mainland (1985/86-1993/94)

(Unit: 1000 ha, 1000 ton, ton/ha)

Crops	1985/86	86/87	87/88	88/89	89/90	90/91	91/92	92/93	93/94
(1) Maize									
Area	1576.28	1484.19	1674.7	1668.95	1631.26	1848.3	1908.16	1581.79	1628.94
Production	2670.77	2244.53	2423.33	2528.05	2227.38	2331.8	2226.42	2282.08	2158.81
Yield	1.7	1.5	1.4	1.5	1.4	1.3	1.2	1.4	1.3
(2) Sorghum									
Area	445.88	409.19	492.23	476.7	486.96	856.3	683.07	641.61	663.69
Production	383.64	363.05	423.51	409.66	537.15	750.2	587.13	719.14	478.3
Yield	0.9	0.9	0.9	0.9	1.1	0.9	0.9	1.1	0.7
(3) Paddy									
Area	265.66	315.03	409.12	385.31	289.29	368.7	306.57	376.76	352.64
Production	417.8	510.77	782.3	767.16	735.99	405.7	392.22	640.91	614.3
Yield	1.6	1.6	1.9	2.0	2.5	1.1	1.3	1.7	1.7
(4) Wheat									
Area	43.45	56.76	60.83	52.85	52.01	50.3	43.79	34.78	34.8
Production	97.9	71.58	75.24	75.24	105.85	83.7	64	59.43	59.44
Yield	2.3	1.3	1.2	1.3	2.0	1.7	1.5	1.7	1.7
(5) Millet									
Area	345.61	300.92	311.9	274.91	145.46	na	308.56	324.59	339.52
Production	300.87	250.17	199.02	217.2	na	na	262.78	210.25	217.79
Yield	0.9	0.8	0.6	0.8	na	na	0.9	0.6	0.6
(6) Cassava									
Area	665.53	639.26	756.44	734.76	590.21	601.2	683.71	657	693.17
Production	1533.5	1124.66	1399.2	1271.94	1730.61	1566.4	1777.65	1708.22	1802.27
Yield	2.3	1.8	1.8	1.7	2.9	2.6	2.6	2.6	2.6
(7) Sweet Potatoes									
Area	97.17	188.68	180.65	198.54	306.54	232	197.68	199.77	205.13
Production	177.35	335.86	319.18	337.31	996.07	290.8	256.99	259.23	266.69
Yield	1.8	1.8	1.8	1.7	3.2	1.3	1.3	1.3	1.3
(8) Pulses									
Area	595.59	326.1	561.02	525.91	579.52	564.7	594.76	544.16	554.48
Production	432.11	251.35	379.2	385.31	384.38	424.6	311.78	405.84	186.69
Yield	0.7	0.8	0.7	0.7	0.7	0.8	0.5	0.7	0.3
(9) Banana/plantains									
Area	262	266	270.85	na	225.96	252.2	264.57	270.06	281.62
Production	777	792.3	792.3	na	823.2	750	793.7	799.68	834.34
Yield	3.0	3.0	2.9	na	3.0	3.0	2.9	3.0	3.6
(10) Cashewnuts									
Area	na	na	na	na	na	na	na	na	na
Production	19.2	18.49	22.47	19.26	37.06	29.85	40.15	na	na
Yield	na	na	na	na	na	na	na	na	na
(11) Tea									
Area	9.18	12.64	12.57	12.57	12.57	12.57	19.36	na	na
Production	15.54	14.11	15.89	15.99	24.71	21.88	19.53	na	na
Yield	1.7	1.1	1.3	1.3	2.0	1.7	1.0	na	na
(12) Coffee									
Area	254.24	254.24	257.73	256.2	242.06	242.06	242.06	na	na
Production	54.77	41	45.51	48.8	53.42	46.21	56.03	na	na
Yield	0.22	0.16	0.18	0.19	0.22	0.19	0.23	na	na
(13) Tobacco									
Area	18.91	21.1	26.29	20.52	22.84	20.58	31.5	na	na
Production	12.55	16.47	12.92	11.56	11.06	11.81	16.45	na	na
Yield	0.66	0.78	0.49	0.56	0.48	0.57	0.52	na	na
(14) Pyrethrum									
Area	7.5	8	8	8	8	8	7.78	na	na
Production	1.35	1.23	1.41	1.31	1.59	1.68	2.22	na	na
Yield	0.18	0.15	0.18	0.16	0.20	0.21	0.29	na	na
(15) Fibres/Cotton									
Area	456.9	486.07	418.07	353.83	389.34	504.29	564.73	na	na
Production	152.66	231.28	222.15	207.58	178.97	254.94	247.24	na	na
Yield	0.33	0.48	0.53	0.59	0.46	0.51	0.44	na	na
(16) Sisal									
Area	51.53	43.08	41.52	42.52	78.23	77.91	77.97	na	na
Production	32.84	30.15	33.17	33.28	32.26	33.74	36	na	na
Yield	0.64	0.70	0.80	0.78	0.41	0.43	0.46	na	na

Source: Basic Data Agriculture and Livestock Sector, 1987/88-1993/94 Ministry of Agriculture, 1995 Note: na. Not Available

Table F.2.7 Imports of Cereals (1990 - 1994)

(Unit: ton)

Year	Maize	Rice	Wheat	Wheat/Flour
1990	2,200	4,908	40,000	-
1991	0	5,446	19,700	-
1992	24,500	44,000	33,000	5,000
1993	-	-	-	-
1994	24,916	50,500	50,500	-

Source: Food Security Department KILIMO, Cited in Industry Review of Maize, Rice and Wheat, MAC, 1994

Table F.3.1 Population by District in Kilimanjaro Region (1978 and 1988)

District	1978	1988	Growth (1978-1988) (%)	Household Nos.	Average Household Size
Rombo	157,715	200,889	27.4	35,278	5.7
Mwanga	74,563	97,004	30.1	17,487	5.5
Same	133,628	169,733	27	30,012	5.7
Moshi Rural	312,041	342,896	9.9	62,673	5.5
Hai	172,444	196,901	14.2	38,179	5.2
Moshi Urban	52,046	96,645	85.7	21,673	4.5
Total	902,437	1,104,068	22.3	205,302	5.4

Source: Kilimanjaro Regional Statistical Abstracts, 1993

Table F.3.2 Area, Production and Per Hectare Yield of Principal Crops in Kilimanjaro Region (1985/86-1993/94)

(Unit: '000 ha, '000 ton, ton/ha)

	1985/86	86/87	87/88	88/89	89/90	90/91	91/92	92/93	93/94
(1) Paddy									
Area	11.6	7.93	4.84	3.92	3.63	2.8	0.95	6.02	6.02
Production	47	23.87	14.91	10.58	15.54	6.1	3.33	2.36	2.36
Yield	4.05	3.01	3.08	2.70	4.28	2.18	3.51	0.39	0.39
(2) Cassava									
Area	na	na	3.92	3.72	5.64	4.3	4.63	5.39	5.5
Production	na	na	2.6	2.42	14.7	11.3	12.04	14.02	14.37
Yield	na	na	0.66	0.65	2.61	2.63	2.60	2.60	2.61
(3) Sweet Potatoes									
Area	na	na	na	na	na	na	0.34	0.8	8.5
Production	na	na	na	na	na	na	0.44	1.1	1.1
Yield	na	na	na	na	na	na	1.29	1.38	0.13
(4) Pulses									
Area	29.03	na	29.23	27.77	105.59	23.5	15.29	12.54	12.53
Production	20.97	na	28.05	26.09	14.9	14.6	8.49	9.1	9.16
Yield	0.72	na	0.96	0.94	0.14	0.62	0.56	0.73	0.73
(5) Bananas									
Area	74	74	71.08	na	37.72	65.2	63.55	72	73.14
Production	222	220.92	220.92	na	213.2	195.6	190.64	216.1	219.44
Yield	6.94	6.90	6.90	na	6.66	6.11	5.96	6.75	6.86
(6) Maize									
Area	131.2	61.09	34.19	29.74	21.71	55.8	56.44	56	58.18
Production	302.8	157.11	31.34	29.74	64.4	64.4	45.14	54.02	28.09
Yield	2.31	2.57	0.92	1.00	2.97	1.15	0.80	0.96	0.48
(7) Sorghum									
Area	2.26	na	1.16	0.98	1.77	3.2	1.03	0.8	0.82
Production	0.54	na	0.69	0.65	5.9	5.2	0.52	0.67	0.9
Yield	0.24	na	0.59	0.66	3.33	1.63	0.50	0.84	1.10
(8) Millet									
Area	7.25	na	3.96	3.76	na	na	5.33	5.3	4.9
Production	8.84	na	1.46	1.36	na	na	1.69	2.1	1.96
Yield	1.22	na	0.37	0.36	na	na	0.32	0.40	0.40
(9) Wheat									
Area	5.85	6	5.58	4.52	na	1.5	na	1.2	1.2
Production	5.81	6.6	5.19	4.15	1.3	1.5	na	0.84	0.84
Yield	0.99	1.10	0.93	0.92	na	1.00	na	0.70	0.70
(10) Coffee									
Area	79.67	79.67	80.48	80.48	76.94	76.94	76.94	76.94	76.94
Production	14.47	8.66	10.3	14.89	10.67	11.8	12.15	14.46	98.37
Yield	0.18	0.11	0.13	0.19	0.14	0.15	0.16	0.19	1.28
(11) Sisal									
Immature	0.04	0.04	0.02	0.01	0.59	0.58	0.57	na	na
Mature	0.91	0.6	0.42	0.43	0.76	0.75	0.77	na	na
Total	0.95	0.64	0.44	0.44	1.35	1.33	1.34	na	na
(12) Sugar Production (TPC)	37.93	33.5	35.7	31.71	26.61	39.11	32.68	33.12	na

Source: Basic Data: Agriculture and Livestock Sector, 1987/88-1993/94, Ministry of Agriculture, 1995

Table F.3.3 Exports of Vegetables and Fruits KIA and DIA

(Unit: ton)

Year	KIA	DIA	Total
		Vegetables	
1990/91	157.5	-	157.5
1991/92	106.4	2.5	108.9
1992/93	306.4	1.5	307.9
1993/94	626.8	-	626.8
1994/95	474.5	0.5	475
		Fruits	
1992/93	-	48.8	48.8
1993/94	-	19.5	19.5
1994/95	-	37.7	37.7

Source: MOA, Plant Protection Section
(Produce Inspection Section)
Quoted from the Documents of the World Bank
Notes:
1) KIA: Kilimanjaro International Airport
2) DIA: Dar es Salaam International Airport
3) Shipment of vegetables consists mainly of green beans occasionally ladies fingers, chillies, egg plants and onions; shipment of fruits consists mainly of fresh mangoes, bananas, pineapples, citrus and avocado destined to Middle East (Muscat).

Table F.3.4 Exports of Flowers via KIA and DIA

(Unit: ton)

Year	KIA	DIA	Total
1990/91	124.5	-	124.5
1991/92	84.4	4.3	88.7
1992/93	144.0	-	144.0
1993/94	535.0	-	535.0
1994/95	734.4	-	734.4

Source: MOA, Plant Protection Section
(Produce Inspection Services)
Quoted from the Documents of the World Bank
Note: 1) KIA: Kilimanjaro International Airport
2) DIA: Dar es Salaam International Airport
3) Exported flowers are mainly Roses but also Euphorbia spp., Ammi majus and Atriplex spp.

Table F.6.1 Distribution of Land by Size Category

(Unit: Households)

Size/Area	Existing Area	Expanded Area	Extension Area	Total
Landless	0	0	1	1
0.1-1ha	9	7	3	19
1.0-1.9ha	18	4	16	38
2.0-2.9ha	6	4	8	18
3.0-3.9ha	2	2	1	5
4.0-4.9ha	4	2	5	11
5.0-5.9ha	0	0	2	2
6.0-6.9ha	0	0	2	2
7.0-7.9ha	0	1	1	2
8.0ha and above	1	0	1	2
Total	40	20	40	100

Source: Farmers' Interview Survey, 1997

Table F.6.2 Place of Origin, Buying Prices and Selling Prices of some Agricultural Products in the Moshi Central Market

(Unit: TSh)

Commodity	Buying Price	Selling Price	Margin(%)	Origin
1. Rice Local (bag, Wholesale)	38,000	50,000	31.5	Moshi, Same, Magugu
IR 54 (bag, Wholesale)	28,000	35,000	25	Lower Moshi, Ndungu
2. Rice Local (kg,Retail)	500	550	10	Lower Moshi, Ndungu
IR 54 (kg, Retail)	350	400	14.3	Lower Moshi, Ndungu
3. Maize (bag)	12,000	15,000	25	Moshi, Arusha
4. Maize flour (kg)	-	300	-	Moshi
5. Wheat (kg.)	150	250	66.7	West Kilimanjaro
6. Wheat flour (kg)	280	320	14.3	Moshi
7. Kidney bean (kg)	500	550	10	Hai
8. Groundnut (kg)	500	550	10	Moshi, Same, Dodoma Rombo,
9. Green gram (kg)	1,000	1,200	20	Same
10.Tomato (kg)	200	300	50	Moshi, Hai
11.Cabbage (kg)	100	300	200	Moshi, Hai
12.Chinese cabbage (kg)	150	200	33.3	Moshi, Hai
13.Sweet Pepper (kg)	150	300	100	Moshi, Hai
14.Carrot (kg)	700	1,000	43	Moshi, Hai
15.Ginger (kg)	350	450	28.6	Same
16.Black night shade (kg)	200	300	50	Moshi, Masaera
17.Coconut (piece)	80	100	25	Tanga, Same
18.Finger millet (kg)	170	500	194	Singida
19. Okra (kg)	500	600	20	Moshi
20. Ngogwe (kg)	500	600	20	Moshi
21.Onion (kg)	400	400	25	Moshi, Hai
22.Amaranth (bunch)	200	300	50	Moshi
23. Eggplant (kg)	200	250	25	Moshi
24. Hot pepper (kg)	700	800	14.3	Moshi
25. Cucumber (kg)	150	250	66.7	Same
26. Garlic (kg)	350	500	42.9	Moshi
27. Orange (piece)	15	20	33.3	Moshi
28. Lemon (kg)	45	300	566.6	Moshi
29. Apple (piece)	220	250	13.6	Mountains
30. Pineapple (piece)	400	500	25	Dar es Salaam, Tanga
31. Banana (bunch)	200	300	50	Uru etc.
32. Mango (piece)	40	50	25	Moshi
33. Avocado (piece)	17	100	488.2	Moshi Rural
34. Round potato (kg)	190	200	5.3	West Kilimanjaro
35. Lime (kg)	222	1,200	440.5	Moshi Rural
36. Watermelon (piece)	150	250	66.7	Lower Moshi
37. Cooking banana (bunch)	-	2000-3000	-	-
38. Beef (mixed, kg)	-	1,000	-	Moshi
39. Beef steak (kg)	-	1,400	-	Moshi
40. Goat meat (kg)	-	1,400	-	Moshi
41. Chicken (piece)	1,700-2,000	2,000-2,200	10.0-18.0	Kahe etc.
42. Egg (piece)	50	53	6	Moshi
43. Fish Sardines (bag)	35,000	37,000	5.7	Mwanza
Sagara (piece)	130	150	15.4	Mwanza
Tilapia (fried, piece)	70	170	142.8	Mungu
Tilapia (fresh, piece)	200	300	50	-
44. Catfish (piece)	2,000	3,000	50	Nmungu
45. Simsim (kg)	400	600	50	Arusha
46. Sugar (kg)	-	400	-	Moshi
47. Salt (kg)	250	300	20	Moshi
48. Charcoal (bag)	2,500	2,800	12	Moshi
49. Urea (bag)	-	11,000	-	Moshi
50. Cowpeas (kg)	400	600	50	Rombo
51. Chick peas (flour, kg)	500	550	10	Hai

Source: Hearing Survey with the Traders in the Moshi Central Market, May 19, 1997

Table F.6.3 Price of Agricultural Commodities in the Moshi Central Market(1996 May-1997 April)

Commodities		1996							1997				
	Unit	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.
1. Paddy *	Bag	12,000	12,000	-	13,000	13,000	14,000	-	15,000	17,000	-	17,000	18,000
2. Rice IR 54*	Kg.	300	280	280	300	300	350	300					20,000
Local variety*	Kg.	400	300	320	300	300	350	350	300	350	350	350	300
3. Maize	Bag	12,000	9,000	9,000	8,000	6,500	-	8,500	400	400	350	400	400
4. Maize flour	Kg.	200	200	200	250	200	200	300	9,000	13,500	10,000	14,000	15,000
5. Wheat	Kg.	-	-	-	170	-	-	-	300	300	200	200	250
6. Wheat flour	Kg.	400	350	400	350	350	350	350	-	-	200	300	300
7. Kidney beans	Kg.	450	300	300	250	300-350	-	300	400	350	350	400	400
8. Groundnuts	Kg.	400	300 400	300	300-400	300	-	400	300	400	500	450	400
9. Green gram	Kg.	400	400	400	400	400	400	500	400	450	450-500	700	700
10. Soybeans	Kg.	-	-	-	350	-	-	-	500	-	200	200	400
11. Tomato	Kg.	400	300	300	300	250-300	300	200	-	-	-	-	-
12. Cabbage	Piece	200	300	200	200	200	200	200	300	400	400-500	500	400
13. Chinese cabbage	Piece	100	300	100	100	100	100	200	250	200	300	300	300
14. Cauliflower	Kg.	500	300	400	400	300	300	300	200	-	100	200	100
15.Sweetpepper	Kg.	400	300	400	400	300-400	400	300	-	-	-	400	300
16. Carrot	Kg.	400	300	300	300	300	300	300	300	400	500	400	400
17. Ginger	Kg.	500	300	500	500	500	500	400	300	500	400	500	500
18. Onion	Kg.	500	300	300	300	200	200	300	800	400	600	700	600
19. Amaranth	Bunch	50	100	100	150	160	100	100	300	300	300	400	300
20. Lettuce	Bunch	100	200	100	400	800	800	-	100	100-200	100-150	100	100
21. Eggplant	Kg.	200	300	300	200	200	200	200	-	-	-	-	300
22. Hot pepper	Kg.	500	600	800	800	800	800	600	300	200	200	300	300
23. Cucumber	Kg.	300	300	300	300	300	300	300	600	1,000	1,000	600	800
24. Garlic	Kg.	800	1,000	800	1,000	800	800	800	300	300	400	300	300
25. Orange/Mandarin	Piece	30	25	25	25-30	30-40	25-30	25-30	800	1,800	1,000	500	500
26. Papaw	Piece	200	200-300	300	150-200	100-200	100-200	200	-	-	30	30	30-40
27. Apple	Piece	-	-	1,200	1,800	-	-	-	150-200	300	200-300	200-300	200
28. Plum	Piece	400	-	-	-	-	-	800	-	400	400	400	-
29. Pineapple	Piece	-	-	500	400	-	300	400-500	300	300-400	400	-	-
30. Banana	Hand	200-300	300	300	300	200	200-300	200-300	150-300	400-500	400-500	-	-
31. Mango	Piece	-	70-100	50	-	-	-	150	250-300	300	300	300	300
32. Avocado	Piece	100	50-100	50-100	100	50-100	100	100-150	-	20-100	50	100	100
33. Grape	Lot	-	-	-	700	100-300	600	-	-	100	100-200	100	100
34. Pear	Piece	200	-	-	-	-	-	-	-	-	-	-	-
35. Watermelon	Kg.	-	400	400	400	300	500	400	-	-	400	400	-
36. Cooking Banana	Bunch	2,000	2,000-4,000	2,000-4,000	2,000-4,000	2,000	3,000	3,000	400 2,000-	400 3000	400 2000-	400 2000-	400 2000-
37. Beef (mixed)	Kg.	1,000	1,000	1,000-1,200	1,200	1,000	1,000	1,200	4000		3000	3000	4000
Beef steak	Kg.	1,200	1,200	1,200	1,500	1,500	1,200	1,400	1,000	1,200	1,200	1,000	1,000
38. Goat meat	Kg.	1,400	1,400	1,500	1,500	500	1,500	1,500	1,200	1,500	1,500	1,200	1,200
39. Chicken	Piece	2,300	2,000-3,000	2,000	2,000	2,000	2,000	2,000	1,400 2,000	1,500 3000	1,500 2000-	1,500 2000	1,500 2000
40. Egg	Piece	60	60	60	60-70	60-70	60-70	60-70			3000		
41. Sugar	Kg.	450	400-450	450	450	400	400	400	60	50	50	50	60
42. Oil		1,000	2,500	600	1,000	1,100	1,000	650	400	400	400	400	400
	Kg., Lite	(mama)	(oki)	(sunola)	(ksuku)	(dips)	(kimbo)	(sunfl.)	600	800	1,000	1,000	1,000
43. Salt	Kg.	200	200	200	200	200	200	200	(sunfl.)	(sunfl.)	(kimbo)	(ksuku)	(kimbo)
44. Charcoal	Bag	2,800	2,500	2,500	2,500	2,500	2,500	2,500	200	200	200	200	200
45. Urea	Bag	12,000	12,000-13,000	11,500	10,600-10,800	12,000-12,500	12,000-12,500	-	2,500 12,000	3,000 -	3,000 -	3,000 -	3,000 11,000

Source: KATC and Hearing Survey with the Traders in Moshi Central Market

Table F.6.4 Prices of some Agricultural Inputs

(1) Fertilizers (TSh/50kg)

Name	Sept. 1995	May,1997	Change (%)
1. Urea 46%	10,700	11,000	2.8
2. Can 26 %	6,000	9,000	50.0
3. NPK 20:10:10	12,500	14,000	12.0
4. SA 21%	5,300	8,000	50.9
5. DAP 20%N and 52	13,000	14,000	7.7
6. TSP 46%	8,000	14,000	75.0

(2) Herbicide (TSh/liter)

Name	Sept.1995	May,1997	Change (%)
1. Gramaxone	5,700	8,600	50.9
2. Round Up	9,850	11,500	16.8
3. Stomp	12,500	11,500	-8.0
4. Buctril MC	11,750	11,750	0.0
5. Fenamine	6,200	5,500	-11.3
6. 24 D Amine	3,300	6,000	81.8
7. Touch Down	11,240	10,200	-9.3

(3) Insecticide

Name	Sept.1995	May,1997	Change (%)
1. Thionex	8,610	8,600	-0.1
2. Dursban	8,800	8,500	-3.4
3. Sumithion	7,550	9,500	25.8
4. Dimecron	8,800	9,000	2.3
5. Basudin	9,000	9,000	0.0
6. Endosulfan	8,200	8,000	-2.4
7. Selecron	17,600	17,600	0

(4) Fungicide (TSh/kg)

Name	Sept.1995	May,1997	Change (%)
1. Ridomil	13,000	17,800	36.9
2. Funguran	6,000	6,500	8.3
3. Dithane M-45	7,600	8,850	16.4
4. Blue Copper	3,200	2,500	-21.9

(5) Hand Tools (TSh.)

Name	Sept.1995	May.1997	Change (%)	Made in
1. Sickles	1,050	1,800	71.4	China
2. Hand hoe	1,850	1,850	0.0	China
3. Forked hoe	6,250	5,350	-14.4	Tanzania
4. Matchet	3,000	3,400	13.3	U.K
Matchet	1,420	1,420	0.0	China
5. Spade	2,000	2,000	0.0	Tanzania
6. Rake	1,500	1,600	6.7	Tanzania
7. Wheel Barrow	24,800	40,500	63.3	Tanzania, Kenya
8. Pick-Axe	3,200	3,000	-6.3	China
9. Watering cane	4,000	5,500	37.5	Tanzania
10. Maize sheller	750,000	750,000	0.0	China
11. Sprayer CP15	33,000	60,000	81.8	Norway
12. Garden tools	900	900	0.0	Tanzania
13. Axe	2,650	2,400	-9.4	China

Source: Tanzania Farmers Association (TFA), Moshi

Table F.6.5 Financial Crop Budget for Paddy Cultivation Without Project Conditions (1/5)

Existing Area (Whole Season)

Particulars	Unit	Price TSh/Unit	Quantity Unit/ha		Value TSh/ha	Remarks
Farm Inputs						
(1) Seed	Kg	350	45		15,750	
(2) Fertilizer						
-Urea	Kg	220	320		70,400	
-TSP	Kg	280				
-SA	Kg	160	110		17,600	
Chemicals						
-Basudin	Liter	9,000	1.5		13,500	
-Endosulfan	Kg	1,650				
Tractor(4 Wheel), O&M					78,000	
Labour			Family *	Hired		
-Field Cleaning	M/D	1,500	17	1	1,500	
-Land Preparation	M/D	1,500			0	
-Field Management	M/D	1,500	6	0	0	
-Nursery Preparation	M/D	1,500	3	0	0	
-Fertilization	M/D	1,500	3	0	0	
-Transplanting	M/D	1,500	17	10	15,000	
-Chemical Application	M/D	1,500	3	0	0	
-Weeding	M/D	1,500	30	0	0	1st an 2nd
-Bird Scaring	M/D	1,500	35	0	0	4 Weeks
-Harvesting/Packing	M/D	1,500	17	13	19,500	
Others						
-Bag	Piece	500	82		41,000	
-Transport	Piece	400	82		32,800	
Total					305,050	
Gross Income	Ton/TSh	175,000	6.6 ton		1,155,000	
Net Income	TSh/ha				849,950	

Note: * Wages for Family Labour are not Included in Financial Crop Budget

Table F.6.5 Financial Crop Budget for Paddy Cultivation Without Project Conditions (2/5)

Expanded Area (Dry Season)

Particulars	Unit	Price TSh/Unit	Quantity Unit/ha		Value TSh/ha	Remarks
Farm Inputs						
(1) Seed	Kg	350	55		19,250	
(2) Fertilizer						
-Urea	Kg	220	270		59,400	
-TSP	Kg	280				
-SA	Kg	160				
Chemicals						
-Basudin	Liter	9,000	1.5		13,500	
-Endosulfan	Kg	1,650				
Tractor(4 Wheel), O&M	Hrs	3,125				
Labour			Family*	Hired		
-Field Cleaning	M/D	1,500				
-Land Preparation	M/D	1,500	34	6	9,000	
-Field Management	M/D	1,500	9	0	0	
-Nursery Preparation	M/D	1,500	3	0	0	
-Fertilization	M/D	1,500	3	0	0	
-Transplanting	M/D	1,500	17	13	19,500	
-Chemical Application	M/D	1,500	3	0	0	
-Weeding	M/D	1,500	20	0	0	1st and 2nd
-Bird Scaring	M/D	1,500	35	0	0	4 Weeks
-Harvesting/Packing	M/D	1,500	17	10	15,000	
Others						
-Bag	Piece	500	57		28,500	
-Transport	Piece	400	57		22,800	
Total					186,950	
Gross Income	Ton/TSh	175,000	4.5 ton		787,500	
Net Income	TSh/ha				600,550	

Note: * Wages for Family Labour are not Included in Financial Crop Budget

Table F.6.5 Financial Crop Budget for Paddy Cultivation Without Project Conditions (3/5)

Expanded Area (Rainy Season)

Particulars	Unit	Price TSh/Unit	Quantity Unit/ha		Value TSh/ha	Remarks
Farm Inputs						
(1) Seed	Kg	350	55		19,250	
(2) Fertilizer						
-Urea	Kg	220	270		59,400	
-TSP	Kg	280				
-SA	Kg	160				
Chemicals						
-Basudin	Liter	9,000	1.5		13,500	
-Endosulfan	Kg	1,650				
Tractor(4 Wheel), O&M	Hrs	3,125				
Labour			Family*	Hired		
-Field Cleaning	M/D	1,500				
-Land Preparation	M/D	1,500	34	6	9,000	
-Field Management	M/D	1,500	7	0	0	
-Nursery Preparation	M/D	1,500	3	0	0	
-Fertilization	M/D	1,500	3	0	0	
-Transplanting	M/D	1,500	17	13	19,500	
-Chemical Application	M/D	1,500	3	0	0	
-Weeding	M/D	1,500	20	0	0	1st and 2nd
-Bird Scaring	M/D	1,500	35	0	0	4 Weeks
-Harvesting/Packing	M/D	1,500	17	7	10,500	
Others						
-Bag	Piece	500	44		22,000	
-Transport	Piece	400	44		17,600	
Total					170,750	
Gross Income	Ton/TSh	175,000	3.5 ton		612,500	
Net Income	TSh/ha				441,750	

Note: * Wages for Family Labour are not Included in Financial Crop Budget

Table F.6.5 Financial Crop Budget for Maize Cultivation Without Project Conditions (4/5)

Existing Lower Moshi Project Area and Expanded Area (Rainy Season)

Particulars	Unit	Price TSh/Unit	Quantity Unit/ha		Value TSh/ha	Remarks
Farm Inputs						
(1) Seed	Kg	1,000	25		25,000	
(2) Fertilizer						
-Urea	Kg	220	25		5,500	
-TSP	Kg	280			0	
-SA	Kg	160			0	
Chemicals						
-Basudin	Liter	9,000			0	
-Endosulfan	Kg	1,650	10		16,500	
Tractor(4 Wheel), O&M					25,000	
Labour			Family*	Hired		
-Field Cleaning	M/D	1,500				
-Land Preparation	M/D	1,500	7		0	
-Field Management	M/D	1,500			0	
-Nursery Preparation	M/D	1,500			0	
-Fertilization	M/D	1,500	2		0	
-Transplanting	M/D	1,500	10	0	0	
-Chemical Application	M/D	1,500	1	0	0	
-Weeding	M/D	1,500	20	0	0	1st an 2nd
-Bird Scaring	M/D	1,500		0	0	
-Harvesting/Packing	M/D	1,500	25	0	0	
Others						
-Bag	Piece	500	23		11,500	
-Transport	Piece	400	23		9,200	
Total					92,700	
Gross Income	Ton/TSh	115,000	2 ton		230,000	
Net Income	TSh/ha				137,300	

Note: * Wages for Family Labour are not Included in Financial Crop Budget

Table F .6.5 Financial Crop Budget for Maize Cultivation Without Project Conditions (5/5)

New Extension Area

Particulars	Unit	Price TSh/Unit	Quantity Unit/ha		Value TSh/ha	Remarks
Farm Inputs						
(1) Seed	Kg	1,000	25		25,000	
(2) Fertilizer						
-Urea	Kg	220			0	
-TSP	Kg	280			0	
-SA	Kg	160			0	
Chemicals						
-Basudin	Liter	9,000			0	
-Endosulfan	Kg	1,650	4		6,600	
Tractor(4 Wheel), O&M	Hrs				25,000	
Labour			Family*	Hired		
-Field Cleaning	M/D	1,500			0	
-Land Preparation	M/D	1,500	7	0	0	
-Field Management	M/D	1,500			0	
-Nursery Preparation	M/D	1,500			0	
-Fertilization	M/D	1,500		0	0	
-Transplanting	M/D	1,500	10	0	0	
-Chemical Application	M/D	1,500	1	0	0	
-Weeding	M/D	1,500	20	0	0	
-Bird Scaring	M/D	1,500		0	0	
-Harvesting/Packing	M/D	1,500	21	0	0	
Others						
-Bag	Piece	500	14		7,000	
-Transport	Piece	400	14		5,600	
Total					69,200	
Gross Income	Ton/TSh	115,000	1.2 ton		138,000	
Net Income	TSh/ha				68,800	

Note: * Wages for Family Labour are not Included in Financial Crop Budget

Table F.6.6 Financial Crop Budget for Paddy Cultivation With Project Conditions (1/5)

Existing Area and New Extension Area (Dry Season)

Particulars	Unit	Price TSh/Unit	Quantity Unit/ha		Value TSh/ha	Remarks
Farm Inputs						
(1) Seed	Kg	350	33		11,550	
(2) Fertilizer						
-Urea	Kg	220	175		38,500	
-TSP	Kg	280	90		25,200	
-SA	Kg	160	350		56,000	
Chemicals						
-Basudin	Liter	9,000	1.5		13,500	
-Endosulfan	Kg	1,650				
Tractor(4 Wheel)					50,000	
Labour			Family*	Hired		
-Field Cleaning	M/D	1,500	17	1	1,500	
-Land Preparation	M/D	1,500			0	
-Field Management	M/D	1,500	6	0	0	
-Nursery Preparation	M/D	1,500	3	0	0	
-Fertilization	M/D	1,500	3	0	0	
-Transplanting	M/D	1,500	17	10	15,000	
-Chemical Application	M/D	1,500	3	0	0	
-Weeding	M/D	1,500	30	0	0	1st an 2nd
-Bird Scaring	M/D	1,500	35	0	0	4 Weeks
-Harvesting/Packing	M/D	1,500	17	18	27,000	
Others						
-Bag	Piece	500	88		44,000	
-Transport	Piece	400	88		35,200	
Total					317,450	
Gross Income	Ton/TSh	175,000	7 ton		1,225,000	
Net Income	TSh/ha				907,550	

Note: * Wages for Family Labour are not Included in Financial Crop Budget

Table F.6.6 Financial Crop Budget for Paddy Cultivation With Project Conditions (2/5)

Existing Area and New Extension Area (Rainy Season)

Particulars	Unit	Price TSh/Unit	Quantity Unit/ha		Value TSh/ha	Remarks
Farm Inputs						
(1) Seed	Kg	350	33		11,550	
(2) Fertilizer						
-Urea	Kg	220	175		38,500	
-TSP	Kg	280	90		25,200	
-SA	Kg	160	350		56,000	
Chemicals						
-Basudin	Liter	9,000	1.5		13,500	
-Endosulfan	Kg	1,650				
Tractor(4 Wheel)					50,000	
Labour			Family*	Hired		
-Field Cleaning	M/D	1,500	17	1	1,500	
-Land Preparation	M/D	1,500			0	
-Field Management	M/D	1,500	6	0	0	
-Nursery Preparation	M/D	1,500	3	0	0	
-Fertilization	M/D	1,500	3	0	0	
-Transplanting	M/D	1,500	17	10	15,000	
-Chemical Application	M/D	1,500	3	0	0	
-Weeding	M/D	1,500	30	0	0	1st an 2nd
-Bird Scaring	M/D	1,500	35	0	0	4 Weeks
-Harvesting/Packing	M/D	1,500	17	13	19,500	
Others						
-Bag	Piece	500	82		41,000	
-Transport	Piece	400	82		32,800	
Total					304,550	
Gross Income	Ton/TSh	175,000	6.5 ton		1,137,500	
Net Income	TSh/ha				832,950	

Note: * Wages for Family Labour are not Included in Financial Crop Budget

Table F.6.6 Financial Crop Budget for Paddy Cultivation With Project Conditions (3/5)

Expanded Area (Dry Season)

	Unit	Price TSh/Unit	Quantity Unit/ha		Value TSh/ha	Remarks
Farm Inputs						
(1) Seed	Kg	350	33		11,550	
(2) Fertilizer						
-Urea	Kg	220	175		38,500	
-TSP	Kg	280	90		25,200	
-SA	Kg	160	350		56,000	
Chemicals						
-Basudin	Liter	9,000	1.5		13,500	
-Endosulfan	Kg	1,650				
Tractor(4 Wheel)					50,000	
Labour			Family*	Hired		
-Field Cleaning	M/D	1,500	17	1	1,500	
-Land Preparation	M/D	1,500			0	
-Field Management	M/D	1,500	6	0	0	
-Nursery Preparation	M/D	1,500	3	0	0	
-Fertilization	M/D	1,500	3	0	0	
-Transplanting	M/D	1,500	17	10	15,000	
-Chemical Application	M/D	1,500	3	0	0	
-Weeding	M/D	1,500	30	0	0	1st an 2nd
-Bird Scaring	M/D	1,500	35	0	0	4 Weeks
-Harvesting/Packing	M/D	1,500	17	13	19,500	
Others						
-Bag	Piece	500	82		41,000	
-Transport	Piece	400	82		32,800	
Total					304,550	
Gross Income	Ton/TSh	175,000	6.5 ton		1,137,500	
Net Income	TSh/ha				832,950	

Note: * Wages for Family Labour are not Included in Financial Crop Budget

Table F.6.6 Financial Crop Budget for Paddy Cultivation With Project Conditions (4/5)

Expanded Area (Rainy Season)

Particulars	Unit	Price TSh/Unit	Quantity Unit/ha		Value TSh/ha	Remarks
Farm Inputs						
(1) Seed	Kg	350	33		11,550	
(2) Fertilizer						
-Urea	Kg	220	175		38,500	
-TSP	Kg	280	90		25,200	
-SA	Kg	160	350		56,000	
Chemicals						
-Basudin	Liter	9,000	1.5		13,500	
-Endosulfan	Kg	1,650				
Tractor(4 Wheel)					50,000	
Labour			Family*	Hired		
-Field Cleaning	M/D	1,500	17	1	1,500	
-Land Preparation	M/D	1,500			0	
-Field Management	M/D	1,500	6	0	0	
-Nursery Preparation	M/D	1,500	3	0	0	
-Fertilization	M/D	1,500	3	0	0	
-Transplanting	M/D	1,500	17	10	15,000	
-Chemical Application	M/D	1,500	3	0	0	
-Weeding	M/D	1,500	30	0	0	1st an 2nd
-Bird Scaring	M/D	1,500	35	0	0	4 Weeks
-Harvesting/Packing	M/D	1,500	17	13	19,500	
Others						
-Bag	Piece	500	75		37,500	
-Transport	Piece	400	75		30,000	
Total					298,250	
Gross Income	Ton/TSh	175,000	6 ton		1,050,000	
Net Income	TSh/ha				751,750	

Note: * Wages for Family Labour are not Included in Financial Crop Budget

Table F.6.6 Financial Crop Budget for Alfalfa Cultivation With Project Conditions (5/5)

Project Area whole

Particulars	Unit	Price TSh/Unit	Quantity Unit/ha		Value TSh/ha	Remarks
Farm Inputs						
(1) Seed	Kg	1,000	10		10,000	
(2) Fertilizer						
-Urea	Kg	220	50		11,000	
-TSP	Kg	280	50		14,000	
-SA	Kg	160			0	
Chemicals						
-Basudin	Liter	9,000			0	
-Endosulfan	Kg	1,650				
Tractor(4 Wheel)					12,500	
Labour			Family*	Hired		
-Field Cleaning	M/D	1,500	0	0	0	
-Land Preparation	M/D	1,500	5	0	0	
-Field Management	M/D	1,500	4	0	0	
-Nursery Preparation	M/D	1,500	0	0	0	
-Fertilization	M/D	1,500	1	0	0	
-Transplanting/planting	M/D	1,500	10	0	0	
-Chemical Application	M/D	1,500	0	0	0	
-Weeding	M/D	1,500	0	0	0	
-Bird Scaring	M/D	1,500	0	0	0	
-Harvesting/Packing	M/D	1,500	20	0	0	
Others						
-Bales	Piece	100	120		12,000	
-Transport	Piece	0	0		0	
Total					59,500	
Gross Income	Ton/TSh	35,000	3 ton		105,000	
Net Income	TSh/ha				45,500	

Note: * Wages for Family Labour are not Included in Financial Crop Budget

Table F.6.7 Economic Crop Budget for Paddy Cultivation Without Project Conditions (1/5)

Existing Lower Moshi Project Area (Whole Season)

Particulars/Cost	Unit	Price TSh/Unit	Quantity Unit/ha	Value TSh/ha
Farm Inputs				
seed	Kg	333	45	14,985
Sub Total				14,985
Fertiliser				
-Urea	Kg	126.3	320	40,416
-TSP	Kg	134.1	0	0
-SA	Kg	67	110	7,370
Sub Total				47,786
Chemicals				
-Basudin	Liter	8,550	1.5	12,825
-Endosulfan	Kg	7,600		0
Sub Total				12,825
Machinery (4 Wheel Tractor)				
-Land Preparation	Hrs	6250	8	50,000
Sub Total				50,000
Labour				
-Field Cleaning	M/D	1,125	18	20,250
-Land Preparation	M/D	1,125	-	
-Field Management	M/D	1,125	6	6,750
-Nursery Preparation	M/D	1,125	3	3,375
-Fertilization	M/D	1,125	3	3,375
-Transplanting/Planting	M/D	1,125	27	30,375
-Chemical Application	M/D	1,125	3	3,375
-Weeding	M/D	1,125	30	33,750
-Bird Scaring	M/D	1,125	35	39,375
-Harvesting/Packing	M/D	1,125	30	33,750
Sub Total			155	174,375
Others				
-Bag	Bag	475	82	38,950
-Transport	Bag	300	82	24,600
Sub Total				63,550
				363,521
Total				
Gross Income	Ton/Tsh	157,500	6.6	1,039,500
Net Income	Tsh/ha			675,979

Table F.6.7 Economic Crop Budget for Paddy Cultivation Without Project Conditions (2/5)

Expanded Area (Dry Season)

Particulars/Cost	Unit	Price TSh/Unit	Quantity Unit/ha	Value TSh/ha
Farm Inputs				
seed	Kg	333	55	18,315
Sub Total				18,315
Fertiliser				
-Urea	Kg	126.3	270	34,101
-TSP	Kg	134.1		0
-SA	Kg	67		0
Sub Total				34,101
Chemicals				
-Basudin	Liter	8,550	1.5	12,825
-Endosulfan	Kg	7,600		0
Sub Total				12,825
				0
Machinery (4 Wheel Tractor)				
-Land Preparation	Hrs		0	0
Sub Total				0
				0
Labour				
-Field Cleaning	M/D	1,125	-	
-Land Preparation	M/D	1,125	40	45,000
-Field Management	M/D	1,125	9	10,125
-Nursery Preparation	M/D	1,125	3	3,375
-Fertilization	M/D	1,125	3	3,375
-Transplanting/Planting	M/D	1,125	30	33,750
-Chemical Application	M/D	1,125	3	3,375
-Weeding	M/D	1,125	20	22,500
-Bird Scaring	M/D	1,125	35	39,375
-Harvesting/Packing	M/D	1,125	27	30,375
Sub Total			170	191,250
Others				
-Bag	Bag	475	57	27,075
- Transport	Bag	300	57	17,100
Sub Total				44,175
				300,666
Total				
Gross Income	Ton/Tsh	157,500	4.5	708,750
Net Income	Tsh/ha			408,084

Table F.6.7 Economic Crop Budget for Paddy Cultivation Without Project Conditions (3/5)

Expanded Area (Rainy Season)

Particulars/Cost	Unit	Price TSh/Unit	Quantity Unit/ha	Value TSh/ha
Farm Inputs				
seed	Kg	333	55	18,315
Sub Total				18,315
Fertiliser				
-Urea	Kg	126.3	270	34,101
-TSP	Kg	134.1		0
-SA	Kg	67.0		0
Sub Total				34,101
Chemicals				
-Basudin	Liter	8,550	1.5	12,825
-Endosulfan	Kg	7,600		0
Sub Total				12,825
Machinery (4 Wheel Tractor)				
-Land Preparation	Hrs		0	
Sub Total				
Labour				
-Field Cleaning	M/D	1,125	-	
-Land Preparation	M/D	1,125	40	45,000
-Field Management	M/D	1,125	7	7,875
-Nursery Preparation	M/D	1,125	3	3,375
-Fertilization	M/D	1,125	3	3,375
-Transplanting/Planting	M/D	1,125	30	33,750
-Chemical Application	M/D	1,125	3	3,375
-Weeding	M/D	1,125	20	22,500
-Bird Scaring	M/D	1,125	35	39,375
-Harvesting/Packing	M/D	1,125	24	27,000
Sub Total			165	185,625
Others				
- Bag	Bag	475	44	20,900
-Transport	Bag	300	44	13,200
Sub Total				34,100
Total				284,966
Gross Income	Ton/Tsh	157,500	3.5	551,250
Net Income	Tsh/ha			266,284

Table F.6.7 Economic Crop Budget for Maize Cultivation Without Project Conditions (4/5)

Existing Lower Moshi Project Area and Expanded Area

Particulars/Cost	Unit	Price TSh/Unit	Quantity Unit/ha	Value TSh/ha
Farm Inputs				
seed	Kg	950	25	23,750
Sub Total				23,750
Fertiliser				
-Urea	Kg	126.3	25	3,158
-TSP	Kg	134.1		0
-SA	Kg	67.0		0
Sub Total				3,158
Chemicals				
-Basudin	Liter	8,550		0
-Endosulfan	Kg	7,600	4	30,400
Sub Total				30,400
Machinery (4 Wheel Tractor)				
-Land Preparation	Hrs	6,250	2	12,500
Sub Total				12,500
Labour				
-Field Cleaning	M/D	1,125		
-Land Preparation	M/D	1,125	7	7,875
-Field Management	M/D	1,125		
-Nursery Preparation	M/D	1,125		
-Fertilization	M/D	1,125	2	2,250
-Transplanting/Planting	M/D	1,125	10	11,250
-Chemical Application	M/D	1,125	1	1,125
-Weeding	M/D	1,125	20	22,500
-Bird Scaring	M/D	1,125		
-Harvesting/Packing	M/D	1,125	25	28,125
Sub Total			65	73,125
Others				
- Bag	Piece	475	23	10,925
-Transportation	Piece	300	23	6,900
Sub Total				17,825
Total				160,758
Gross Income	Ton/Tsh	99,300	2	198,600
Net Income				37,843

Table F.6.7 Economic Crop Budget for Maize Cultivation Without Project Conditions (5/5)

New Extension Area

Particulars/Cost	Unit	Price TSh/Unit	Quantity Unit/ha	Value TSh/ha
Farm Inputs				
seed	Kg	950	25	23,750
Sub Total				23,750
Fertiliser				
-Urea	Kg	126.3		0
-TSP	Kg	134.1		0
-SA	Kg	67.0		0
Sub Total				
Chemicals				
-Basudin	Liter	8,550		0
-Endosulfan	Kg	7,600	4	30,400
Sub Total				30,400
Machinery (4 Wheel Tractor)				
-Land Preparation	Hrs	6,250	2	12,500
Sub Total				12,500
Labour				
-Field Cleaning	M/D	1,125		
-Land Preparation	M/D	1,125	7	7,875
-Field Management	M/D	1,125		
-Nursery Preparation	M/D	1,125		
-Fertilization	M/D	1,125		
-Transplanting/Planting	M/D	1,125	10	11,250
-Chemical Application	M/D	1,125	1	1,125
-Weeding	M/D	1,125	20	22,500
-Bird Scaring	M/D	1,125		
-Harvesting/Packing	M/D	1,125	21	23,625
Sub Total			59	66,375
Others				
- Bag	Piece	500	14	7,000
-Transportation	Piece	300	14	4,200
Sub Total				11,200
Total				144,225
Gross Income	Ton/Tsh	99,300	1.2	119,160
Net Income	Tsh/ha			-25,065

Table F.6.8 Economic Crop Budget for Paddy Cultivation with Project Conditions (1/5)

Existing Lower Moshi Project Area and New Extension Area (Rainy Season)

Particulars/Cost		Unit	Price TSh/Unit	Quantity Unit/ha	Value TSh/ha
Farm Inputs					
	seed	Kg	333	33	10,989
	Sub Total				10,989
	Fertiliser				
	-Urea	Kg	126.3	175	22,103
	-TSP	Kg	134.1	90	12,069
	-SA	Kg	67.0	350	23,450
	Sub Total				57,622
	Chemicals				
	-Basudin	Liter	8,550	1.5	12,825
	-Endosulfan	Kg	7,600		0
	Sub Total				12,825
Machinery (4 Wheel Tractor)					
	-Land Preparation	Hrs	6,250	8	50,000
	Sub Total				50,000
Labour					
	-Field Cleaning	M/D	1,125	18	20,250
	-Land Preparation	M/D	1,125		
	-Field Management	M/D	1,125	6	6,750
	-Nursery Preparation	M/D	1,125	3	3,375
	-Fertilization	M/D	1,125	3	3,375
	-Transplanting/Planting	M/D	1,125	27	30,375
	-Chemical Application	M/D	1,125	3	3,375
	-Weeding	M/D	1,125	30	33,750
	-Bird Scaring	M/D	1,125	35	39,375
	-Harvesting/Packing	M/D	1,125	30	33,750
	Sub Total			155	174,375
Others					
	-Bag	Bag	475	82	38,950
	-Transport	Bag	300	82	24,600
	Sub Total				63,550
Total					369,361
	Gross Income	Ton/Tsh	157,500	6.5	1,023,750
	Net Income	Tsh/ha			654,390

Table F.6.8 Economic Crop Budget for Paddy Cultivation with Project Condition (2/5)

Existing Lower Moshi Project Area and New Extension Area (Dry Season)

Particulars/Cost		Unit	Price TSh/Unit	Quantity Unit/ha	Value TSh/ha
Farm Inputs					
	seed	Kg	333	33	10,989
	Sub Total				10,989
	Fertiliser				
	-Urea	Kg	126.3	175	22,103
	-TSP	Kg	134.1	90	12,069
	-SA	Kg	67.0	350	23,450
	Sub Total				57,622
	Chemicals				
	-Basudin	Liter	8,550	1.5	12,825
	-Endosulfan	Kg	7,600		0
	Sub Total				12,825
Machinery (4 Wheel Tractor)					
	-Land Preparation	Hrs	6,250	8	50,000
	Sub Total				50,000
Labour					
	-Field Cleaning	M/D	1,125	18	20,250
	-Land Preparation	M/D	1,125		
	-Field Management	M/D	1,125	6	6,750
	-Nursery Preparation	M/D	1,125	3	3,375
	-Fertilization	M/D	1,125	3	3,375
	-Transplanting/Planting	M/D	1,125	27	30,375
	-Chemical Application	M/D	1,125	3	3,375
	-Weeding	M/D	1,125	30	33,750
	-Bird Scaring	M/D	1,125	35	39,375
	-Harvesting/Packing	M/D	1,125	35	39,375
	Sub Total			160	180,000
Others					
	-Bag	Bag	475	88	41,800
	-Transport	Bag	300	88	26,400
					68,200
Total					379,636
	Gross Income	Ton/Tsh	157,500	7	1,102,500
	Net Income	Tsh/ha			722,865

Table F.6.8 Economic Crop Budget for Paddy Cultivation with Project Condition (3/5)

Expanded Area (Rainy Season) Particulars/Cost		Unit	Price TSh/Unit	Quantity Unit/ha	Value TSh/ha
Farm Inputs					
	seed	Kg	333	33	10,989
	Sub Total				10,989
	Fertiliser				
	-Urea	Kg	126.3	175	22,103
	-TSP	Kg	134.1	90	12,069
	-SA	Kg	67.0	350	23,450
	Sub Total				57,622
	Chemicals				
	-Basudin	Liter	8,550	1.5	12,825
	-Endosulfan	Kg	7,600		0
	Sub Total				12,825
Machinery (4 Wheel Tractor)					
	-Land Preparation	Hrs	6,250	8	50,000
	Sub Total				50,000
Labour					
	-Field Cleaning	M/D	1,125	18	20,250
	-Land Preparation	M/D	1,125		
	-Field Management	M/D	1,125	6	6,750
	-Nursery Preparation	M/D	1,125	3	3,375
	-Fertilization	M/D	1,125	3	3,375
	-Transplanting/Planting	M/D	1,125	27	30,375
	-Chemical Application	M/D	1,125	3	3,375
	-Weeding	M/D	1,125	30	33,750
	-Bird Scaring	M/D	1,125	35	39,375
	-Harvesting/Packing	M/D	1,125	30	33,750
	Sub Total			155	174,375
Others					
	-Bag	Bag	475	75	35,625
	-Transport	Bag	300	75	22,500
					58,125
Total					363,936
	Gross Income	Ton/Tsh	157,500	6	945,000
	Net Income				581,065

Table F.6.8 Economic Crop Budget for Paddy Cultivation with Project Conditions (4/5)

Expanded Area (Dry Season) Particulars/Cost		Unit	Price TSh/Unit	Quantity Unit/ha	Value TSh/ha
Farm Inputs					
	seed	Kg	333	33	10,989
	Sub Total				10,989
	Fertiliser				
	-Urea	Kg	126.3	175	22,103
	-TSP	Kg	134.1	90	12,069
	-SA	Kg	67.0	350	23,450
	Sub Total				57,622
	Chemicals				
	-Basudin	Liter	8,550	1.5	12,825
	-Endosulfan	Kg	7,600		0
	Sub Total				12,825
Machinery (4 Wheel Tractor)					
	-Land Preparation	Hrs	6,250	8	50,000
	Sub Total				50,000
Labour					
	-Field Cleaning	M/D	1,125	18	20,250
	-Land Preparation	M/D	1,125		
	-Field Management	M/D	1,125	6	6,750
	-Nursery Preparation	M/D	1,125	3	3,375
	-Fertilization	M/D	1,125	3	3,375
	-Transplanting/Planting	M/D	1,125	27	30,375
	-Chemical Application	M/D	1,125	3	3,375
	-Weeding	M/D	1,125	30	33,750
	-Bird Scaring	M/D	1,125	35	39,375
	-Harvesting/Packing	M/D	1,125	30	33,750
	Sub Total			155	174,375
Others					
	-Bag	Bag	475	82	38,950
	-Transport	Bag	300	82	24,600
	Sub Total				63,550
Total					369,361
	Gross Income	Ton/Tsh	157,500	6.5	1,023,750
	Net Income	Tsh/ha			654,390

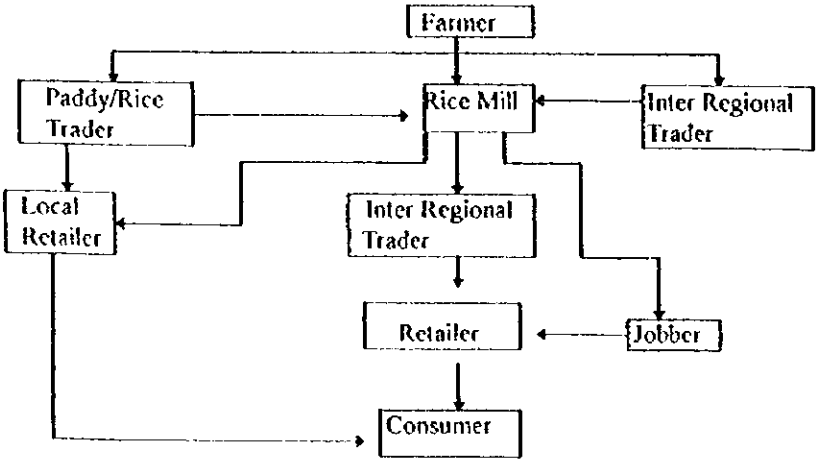
Table F.6.8 Economic Crop Budget for Alfalfa Cultivation With Project Conditions (5/5)

Whole Study Area

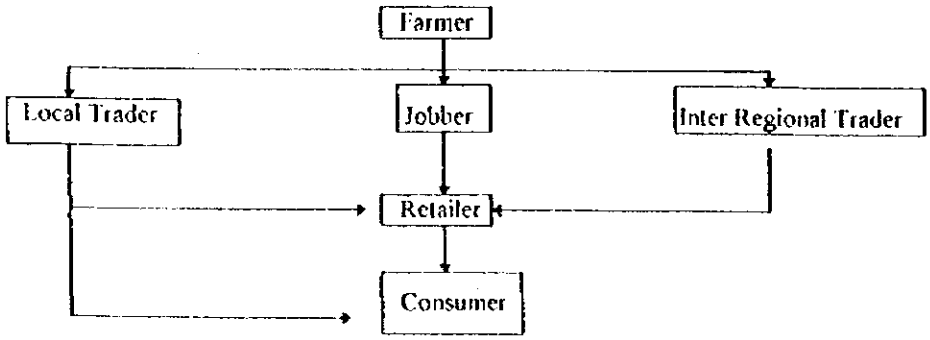
Particulars/Cost		Unit	Price TSh/Unit	Quantity Unit/ha	Value TSh/ha
Farm Inputs					
	seed	Kg	950	10	9,500
	Sub Total				9,500
	Fertiliser				
	-Urea	Kg	126.3	50	6,315
	-TSP	Kg	134.1	50	6,705
	-SA	Kg	67.0		0
		Kg			0
	Sub Total				13,020
	Chemicals				
	-Basudin	Liter	8,550		0
	-Endosulfan	Kg	7,600		0
	Sub Total				0
Machinery (4 Wheel Tractor)					
	-Land Preparation	Hrs	6,250	2	12,500
	Sub Total				12,500
Labour					
	-Field Cleaning	M/D	1,125		
	-Land Preparation	M/D	1,125	5	5,625
	-Field Management	M/D	1,125	4	4,500
	-Nursery Preparation	M/D	1,125		
	-Fertilization	M/D	1,125	1	1,125
	-Transplanting/Planting	M/D	1,125	10	11,250
	-Chemical Application	M/D	1,125		0
	-Weeding	M/D	1,125		0
	-Bird Scaring	M/D	1,125		
	-Harvesting/Packing	M/D	1,125	20	22,500
	Sub Total			40	45,000
Others					
	-Bag	Piece	500		0
	-Transportation	Piece	300		0
Total					80,020
	Gross Income	Ton/Tsh	33,300	3	99,900
	Net Income	Tsh/ha			19,880

Figures

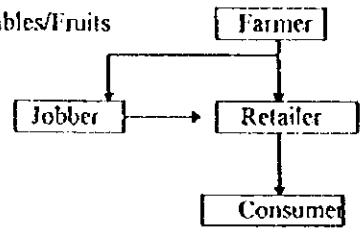
(1) Paddy/Rice



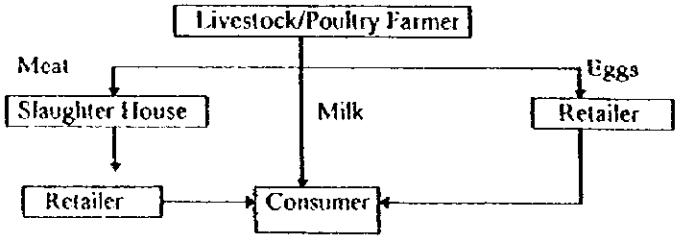
(2) Maize



(3) Vegetables/Fruits



(4) Livestock Products



Source: Based on Hearing Survey, 1997

Figure F.4.1 Flow of Agriculture and Livestock Products in and around the Study Area	The Feasibility Study on Lower Moshi Integrated Agriculture and Rural Development Project in the United Republic of Tanzania Japan International Cooperation Agency

ANNEX-G

INSTITUTIONAL DEVELOPMENT

ANNEX - G

INSTITUTIONAL DEVELOPMENT

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1 FARMERS' ORGANISATIONS

1.1 Present Condition of Village Community

A village community, as well as the village government, has a great influence on the activities of farmers' organization which is established by the village people. The villages in the Study Area have been registered under the Local Government Act, 1982, and have a relatively matured community even thought the village's population consists of various tribes such as Pare, Chagga and Sambaa, as shown in Table G.1.1. Most of the troubles and/or problems among the villages are solved by the community according to their traditional norms. The sort of trouble that occurred in recent years are related to shortage of irrigation water in the existing Lower Moshi Project(the Existing Project). Almost no problem among tribes was found in all villages of the Study Area.

Each village has an administrative organization which is organized as the smallest unit of the administrative structure. The organizational structure of this village government is shown in the Figure G.1.1. Under a village council, the village government consists of a chairman, a village executive officer and several committees including a committee of defense and security, planning and financing committee, social services committee, etc. Members of the council and the village chairman are elected by the villagers. A village executive officer who has a relatively higher educational level is in charge of administrative work.

1.2 Present Condition of Farmers' Organizations

Under the present legislation system in Tanzania, there are two methods for establishing farmer organizations that acquire a juridical status through the registration to the Government; One method is in conformity with the Societies Ordinance of 1954; and the other method is in conformity with the Cooperative Societies Act No. 51 of 1991. The former is applied to the case of non-profit legal persons for implementing public services, and the later is applied to associations of persons that have voluntarily joined together for the purpose of achieving common needs. Thus, it is the only way left for any farmers' organizations who conduct economic activities to acquire a legal person under the Cooperative Societies Act No. 51, 1991. The Cooperative Societies Act provides for the formation of an independent, member-controlled, cooperative movement based on the international cooperatives' concepts and principles. Any farmers' organizations that want to get a legal status through registration to the government, therefore, have to conform to such concepts and principle even if their character are not suitable to such principles.

Generally, farmers' organizations may divided into two categories; an organization registered to the Government in accordance with the Cooperative Societies Act 1991; and an organization which has not been registered yet but deemed to be able to register under the same Act. In the Study Area, the farmers' organizations included in the former category are agricultural marketing cooperatives and the Paddy Farmers Association (CHAWAMPU), and in the later category are water users association/groups in existing irrigation schemes and women's and youth groups, etc.

1.2.1 Farmers' Marketing Cooperatives

(1) Historical background

The history of cooperative development in Tanzania can generally be classified into the following six main periods today:

- The growth of indigenous cooperatives (1925-61)
- The nationalistic period: expansion of cooperatives (1961-67)
- The infusion of the *ujama* ideology into cooperation(1967-76)
- Dissolution of cooperatives and the parastatalisation by produce of the economy(1976-

84)
- The reinstatement of cooperatives and the retreat of the parastatal sector(1982-91), and
- Deofficialisation of cooperatives and privatization(1991-to date).

In Tanzania, cooperatives are associated with the introduction of cash crops, especially coffee, cotton, and tobacco. The cooperative organizations first started in 1925 in Kilimanjaro area; where indigens organized themselves the Kilimanjaro Native Planters Association(KNPA) to protect and promote the interests of the native coffee growers as well as to improve quality and guard against pests and disease. The KNPA was not officially accepted by the colonial administration until 1932, when the first Cooperative Ordinance was enacted. It was formally registered as a true farmer' association by the name of the Kilimanjaro Native Cooperative Union (KNCU) in 1933.

With the winning of independence in 1961, there were new initiatives by the independent government to extend the dominance of cooperatives. In 1961 cooperative's number reached 857. Agricultural Marketing Boards were established by the act of Agricultural Products in 1962. The Boards were granted monopolistic powers in terms of crop purchase and price determination. The traditional marketing cooperatives were owned and controlled by the members on a democratic basis up to 1968.

In 1967 Tanzania adopted a socialist development strategy by proclaiming the Arusha Declaration. The Arusha Declaration came up with a new concept for rural agricultural cooperative, that extended beyond the marketing functions such as the tasks of transformation of *Ujamaa* villages through collective production. Thus, the cooperatives were regarded as crucial instruments in the building of socialist society. This led to increasing political pressure to form economically nonviable cooperative societies. Cooperative Act of 1968 provided a legal basis for political interference.

During the 1970s agricultural marketing cooperatives became unpopular to the Government as they were unable to meet the government's expectations. In order for cooperatives to fit with the idea of *ujama* villages, the Government began to design an alternative marketing system which led to dissolution of cooperatives in 1976. The villages were considered multipurpose cooperative societies, with major emphasis laid on collective production through integrating smallholders' production into the government's administrative structure. The legal framework of this policy was provided by the Village Act of 1975. However, such villagezation contributed to the decline in agricultural output during the 1970s because most villages were too small to support economically viable societies.

In 1982 the Government prepared a new Agricultural Policy that encouraged private investment in agriculture and formally abandoned the transformation of smallholder agriculture into producer cooperatives. The new cooperative law was enacted in 1982 to reinstate the marketing cooperatives. The Cooperative Societies Act of 1982, however, failed to remove the inherited contradictions in the sector. The issue of voluntary and open membership was not addressed either. Every villager living in a given village was regarded automatically a member of that society. This policy led to chaos. Primary societies and unions were hastily formed without regard for economic viability or managerial capacity. Large debt was incurred with the banking system. Furthermore, the then ruling party (CCM) continued to dictate terms of operating cooperatives through the apex for cooperatives.

A combination of both internal and external pressures forced the Tanzania government to adopt various economic and political reforms. The Government prepared the first comprehensive Economic Recovery Programme(ERP) in 1986, and the Economic and Social Action Programme (ESAP) in 1989. At the beginning of 1991, the Government convened a major conference on cooperative reforms in Arusha as a result of pressure from the donor community and cooperators at home. Out of this conference, the Cooperative Society Act of 1991 was born. The reforms in the cooperative sector were partly influenced by the wider ongoing economic reforms that were introduced in the country.

The Cooperative Societies Act of 1991, which repealed and replaced the Act of 1982, encourages formation of autonomous and self-reliant cooperatives. In essence it is based on the internationally recognized cooperative principles. Under the present system cooperatives have four-tiered structure, viz. the primarie, secondary societie, apexe and federation. In the agricultural marketing sector five specialized form of cooperative structure have been formulated. These are: coffee, cotton, cashew nuts, tobacco and mixed crops. The process of restructuring the movement is now underway.

(2) Present conditions of Kilimanjaro Region

The present cooperative organization structure in the Kilimanjaro region is shown in Figure G.1.2. There exist two cooperative unions, namely Killimanjaro Native Cooperation Union(KNCU) and Vuasu Cooperative Union (VCU). The main objectives of the unions are to improve marketing of crops and to support farm inputs supply to the farmers. The salient features of these unions are shown in below table:

Cooperative Unions for Agricultural Marketing

	Killimanjaro Native Cooperative Union (KNCU)	Vuasu Cooperative Union (VCU)
(1) Year Established	1984	1984
(2) Districts covered	Rombo,Moshi rural,Hai	Mwanga,Same
(3) Crops covered	Coffee, Maize, Beans Paddy, Sunflower, etc.	Coffee, Maize, Beans Paddy, Sunflower, etc.
(4) No. of primary coop. societies	86	30
(5) No. of total members	117,542	31,725
(6) Total debt position in 1992(Tsh. millions)	2,923.9	320.6

Source: Regional Agricultural Coopeative Officer

Before the enforcement of the new cooperative act, there were a total numbers of 333 primary agricultural cooperatives under the two unions. However, as of August 1996, only 116 primary agricultural cooperative societies have been organized with a total members of 149,267, of which 104 cooperatives are for coffee, 9 for cotton, 2 for dairy, and one for mixed crops.

Almost all the cooperatives have been re-registered as an authorized organization under the Cooperative Act of 1991. The membership of a cooperative is about 1,300 farmers on average ranging from 4,325 of Tarakea cooperative in Rombo district to 202 of Lukani cooperative in Hai district, and its management area covers one or more villages.

In general, agricultural cooperatives in Kilimanjaro region have faced various operational, managerial and organizational problems. Some of these problems have their origin within the cooperatives themselves and there are also other external factors. Such problems may be summarized as follows:

(a) There are external forces that impinge cooperatives' efforts to improve marketing efficiency such as bank interest rates, storage and transport costs, etc. The increase in bank interest is partially responsible for the growing cooperative indebtedness to the Public Financial Institutions (PFI) such as CRDB and NBC. The debt position indicates that KNCU were highly indebted though VCU were able to meet its debt obligation. Another important problem is delays in payments to unions, caused by the cooperatives major trading partners, mainly the Marketing Boards.

(b)In the process of crop purchases there are some observed weaknesses. The primary cooperative societies assemble, grade and package crops ready for transportation.

The secondary societies arrange transport of crops to either processing plants(cotton, coffee) or directly to Marketing Boards' storage facilities by using own or hired trucks. In most areas cooperatives have few storage and transport facilities of their own. Due to the inadequate storage and transport capacity, many crops purchased by primary societies sometimes get spoiled before reaching their final destinations.

(c) Most cooperative societies are ill-equipped in the highly trained manpower. Lack of market information is partly responsible for the cooperatives' ineffectiveness in agricultural marketing.

(d) In order to finance operations and crop purchases, cooperatives depend on borrowed finances mainly from the NBC and CRDB. In the past, for the PFI to lend money to cooperatives the Government, through the office of the Commissioner for Cooperatives, had to guarantee the loans. This practices have now been abandoned under the introduced liberalization.

(e) With the deregulation of input supply, cooperatives are left out to continue servicing their members without proper credit arrangements.

(f) There are organizational and managerial weaknesses. Thus, there are inefficient book-keeping practices, widespread dishonesty and overstuffing.

(3) Present condition in the Study Area

In the Study Area, there exists one primary agricultural cooperative named Tella Mandaka Agricultural Cooperative(TMAK) in Mandaka Mnono village. The reasons why cooperatives exists so few in the Study Area are conjectured from the following facts:

(a) Earlier agricultural cooperatives under the socialism period was rather collective agricultural production societies with bureaucratic color than ones under the international cooperatives' concept. Farmers are generally not so positive to reorganize agricultural cooperative societies even if new cooperatives will be operated under democratic principles.

(b) The Study Area is located immediately in the vicinity of Lower Moshi town where many agriculture related traders engage in commerce. Farmers can easily access to these trader to sell their produce and to buy necessary inputs.

(c) Furthermore, paddy and maize are major crops growing in the Study Area except some part of areas in Mandaka Mnono village. These crops are usually traded through traders who go to the villages and pick up the products

(d) The Study Area covers 8 villages, of which the paddy cultivated farmers living in Mabogini, Chekereni, Rau Ya Kati, and Oria villages have established CHAWAMPU mentioned later. In addition, Mtakuja and Mvuleni villages have not matured as a rural community because relatively short time since the villages was established.

(4) Outline of Tella Mandaka Agricultural Cooperative(TMAK)

TMAK was organized in 1984 with the purposes of marketing services to the farmers such as farm inputs and all storable crops including paddy, maize, cotton, etc. However, its economic activities were concentrated on the marketing of coffee. Accordingly, members who benefit from the cooperative activities are mainly coffee cultivators.

The TMAK covers two villages, Tella and Mandaka Mnono. The organizational set-up of TMAK is composed of the General Assembly, Board of Directors and employed staff. General assembly which is a members' meeting meets once a year. Board of Directors is responsible for policy formulation and decision making. The member have to contribute a share of Tsh. 1,000, and to pay the entrance fee of Tsh. 500. The membership of TMAK is 1,010 as of February 1996. While TMAK possess some tractors, these facilities are over the life of machine and most of them are out of use.

In its inception in 1984 TMAK was active and managed to supply agricultural inputs to both farmers in Tella and Mandaka Mnono villages. It also purchase their farm products; i.e. paddy, cotton and coffee. As time goes on the services to Mandaka Mnono village was cut up and no longer TMAK is concentrated with the farmers in that village. In the village, there are only 50 TMAK's members, but name only and inactive.

Since 1994 to date the organization remains dormant. Reasons why TMAK become inactive are summarized below:

(a) Poor planning and negligence on its establishment; It means that the organization objectives were not clearly analyzed at the stages of establishing the TMAK, and unforeseen contingencies ike competitors, O & M staffs required, etc.were not clearly forecasted.

(b) Insufficient capital; and

(c) After implementing liberalization policy, there are many dealers to date who buys coffee from farmers at a resonable price in cash such as Dorman, Mazao LTD, City Coffee, KNCU etc.

(5) Outline of Uwanja Wa Mbuni Farmer Shop

In addition to the above, an organization named Uwanja Wa Mbuni Farmer Shop (the Shop) has been operating in Chekereni village. The shop is a product of liberalization policy introduced in 1990 for the purpose of promoting private sectors. The shop was established in 1993 after the liquidation of the Uwanja Wa Mbuni Rural Cooperative Society which was established in 1987.

The application for registration had been sent to the cooperative department in Moshi rural since January 1996 to enable the shop to obtain its registration under the 1991 cooperative act. The registration has not been obtained yet. The outline of the shop is as follows:

(a) Objective

Procurement and supply of farm inputs and building materials to the Chekereni farmers and neighboring villagers such as Rau Ya Kati, Mtakuja, Mkonga , Mawara, NAFCO farmers, etc.

(b) Capital source

Source of capital is membership fees and shares. The shop started with an initial capital of Tsh. 527,000 arising the defunct rural cooperative society. At present the shop has a capital amount to Tsh. 3.3 million.

(c) Membership

At present the shop has 527 members. Each member pays Tsh. 50 as the entry fee and Tsh. 4,000 as share.

(d) Organization and management

Tweleve members of the defunct rural cooperative society's committee have engaged in managing the shop. There is one shop keeper and one committee member who serve on monthly shift. The committee members are responsible on counting cash, assisting n the purchases of commodities and ensuring proper book entries. In addition, there is one full-time shop keeper whose allowance is 25% of the monthly profit.

The shop has procured commodities in cash from the retailers in Moshi town. The prices of the commodities sold by the shop are tend to be higher than that in other retailares in Moshi town due to the transportation charges and other expenses incurred in running the shop. Farmers are willingly to buy as they are aware of the costs.

The following is a price list of agricultural inputs both at buying and selling:

Inputs	Quantity	Buying Price (Tsh.)	Selling Price (Tsh.)
(a). Fertilizers			
- Urea	50kg	10,500	11,500
- ASA	50kg	5,920	6,700
(b).Agro-chemicals			
- Dursban(Insecticide)	liter	9,500	10,500
- Dasudin(Insecticide)	liter	-do-	-do-
- Daiasinon	liter	-do-	-do-
- Sumithinon	liter	-do-	-do-
- Furaden fungicide	kg	2,500	2,800
- Blue copper	kg	2,500	2,900
(c). Weed killers			
- Round up	liter	9,500	10,500
- 2-4 D-Amin	liter	6,000	7,000

Source: JICA Study team/the shop as of May 1997.

Uwanja wa mbuni shop have managed so far to record net profit at the period illustrated below:

Period	Net Profit(Tsh.)
1995	450,516
1996	1,666,022

Source: JICA Study team/the shop as of May 1997.

Quantity of agricultural inputs purchased and sold in 1996 are given below:

Inputs	Unit	Purchased	Sold	Balance
Fertilizers	tons	10	10	-
Insecticides	liters	100	80	20
Furadan	tons	1	1	-
Blue copper	tons	1	1	-

1.2.2 Paddy Growers Association (CHAWAMPU) in Lower Moshi Irrigation Project

(1) Historical background

The Government of Japan(GOJ) implemented the Kilimanjaro Agricultural Development Center Project (KADC) from September 1978 to March 1986, aiming at water resource development for irrigation, on-site verification of proposed crops at the experimental farm, farmers' training and extension services. With the favorable results of on-site verification of rice, a feasibility study on the Lower Moshi Agriculture Development Project was carried out in 1980, and then the construction of Lower Moshi Irrigation Project(the Existing Project) started in 1982 under financial assistance of GOJ and completed in 1987. The Existing Project covered an area of 2,300 ha out of which 1,100 ha are for paddy fields and the remaining 1,200 ha are for upland crops. GOJ further provided the technical cooperation under the title of the Kilimanjaro Agriculture Development Project (KADP) from 1986 to 1993. KADP's responsibility was a) to select suitable crops, b) to establish an optimum rice cultivation system, c) to introduce suitable agricultural machinery for paddling, d) to operate and maintain the existing irrigation Project, and e) to train the concerned staff and farmers. The running costs for KADP were borne by the Government of Tanzania(GOT) with the subsidy in terms of machinery and spare parts from GOJ. Then, Japanese agricultural expert has now stationed at

KADP to continue the technical cooperation to the Existing Project. In concert with the KADP's activities, the farmers involved in the Existing Project voluntarily organized four (4) Water Users' Association (WUAs) one each in Mabogini, Chekereni, Rau Ya Kati , and Oria, respectively, and one Central Water Users Committee. The main objectives of these WUAs and the Committee are confined to collect money for land preparation fee and water charge from the farmers, and to convey necessary information from KADP to the farmers. The money collected from the farmers were sent to Treasury through KADP. The organization chart of KADP is shown in Figure G.1.3.

Under the Economic Recover Programme, GOT decided to withdraw from the assistance to economic generating activities including the Existing Project. In order to cope with the situation, the KADP encouraged the establishment of a new farmers organization having qualifications for taking over the project facilities and their operation. In 1993, the existing four WUAs were dissolved into the new organization named CHAWAMPU. CHAWAMPU has been registered as a cooperative society in March 1993, in accordance with the Cooperative Act No. 15, of 1991.

(2) Outline of CHAWAMPU

(a) Objectives of CHAWAMPU

The objectives of CHAWAMPU laid down in its by-law (ATTACHMENT-G.1) are as follows:

a)To raise the social economical conditions of its members by increasing income through the application of modern agriculture techniques, and improve their living standards,

b) To promote agriculture activities for its members and whenever possible to develop agricultural cooperative, agricultural production and to perform any other social economical activities, and

c) To offer and develop cooperative education amongst its members.

In order to fulfill the objective mentioned above, CHAWAMPU is accountable to the followings:

a) Procurement, storage and supply/sell of agricultural inputs and all essential commodities required for the economical development of CHAWAMPU,

b) Procure, operate and ensure efficient utilization of crop processing machines,

c) Establishment and management of crop plantation,

d) Collection, processing and sell of crops,

e) Advice members on the importance of applying modern agricultural techniques,

f) Maintain and develop land which will be distributed to the member for agricultural production,

g) Advice members on the proper utilization of land for agricultural production,

h) Operate and maintain farm machineries and equipment for the better use of its members and CHAWAMPU, and

i) Carry out all beneficial activities essential for the fulfillment of the CHAWMPU's objectives.

The actual function expected to CHAWAMPU is somewhat different from the above accountability though some of them retains common features. Because CHAWAMPU's by-law seem to be quoted from a standard by-law prepared by the Department of Cooperative for applying to general agricultural cooperatives. CHAWAMPU has actually dual functions; one is as an agricultural marketing

cooperative and the other as a mandatory water users association like the Japanese Land Improved District under the Land Improvement Law. The present by-law seems to be rather suitable for the agricultural marketing cooperative than for the mandatory water users association . Therefore, the real responsibility of the management and operation of irrigation facilities and structures should be incorporated in the by-law as far as possible.

(b) Organization of CHAWAMPU

The organization chart of CHAWAMPU is shown in Figure G.1.4. The highest administrative organ of CHAWAMPU is a general meeting of members held at least once a year . The general meeting discusses and approves an annual budget and audit reports, and any other general issues.

A board as an executive organ has been organized. The board consist of 15 members allocated to Mabogini, 6; Rau Ya Kati, 4; Cehkereni, 3; and Oria, 2. These board members are elected by CHAWAMPU's member in each village. The chairman is elected by the board members at the general meeting. The term of the chairman and the board members is both 3 years, and 1/3 board members will be renewed each year as per the Cooperative Act. The board meets once every three months, or more if necessary. The board members review the planned activities and the progress reports from other committees.

Under the executive board, three (3) standing committees have been organized: Finance and Planning Committee; Agriculture and Water Management Committee; and Machinery and Construction Committee. Each committee meets once every two months, or more if necessary, to discuss progress of its planned activities and solve problems forwarded to them.

The executive board is supported by a secretary office managed by a secretary employed. In the main office about 15 permanent employees are working as accountant, cashier, typist, office attendant, store clerk, and watchmen.

Apart from the standing committees mentioned above, sub-committee under the executive board is organized in each village. The sub-committee has one chairman, one executive officer, one extension officer, and some committee's members ranging from 5 in Mabogini village to 1 in Oria village. Each Sub-Committees normally meet once every month to implement its planned activities.

(c) Membership of CHAWAMPU

Under the CHAWAMPU's by law, the membership of CHAWAMPU is opened to any person who: a) possess farm land in CHAWAMPU area , b) is 18 years old or older, c) agree on the conditions and regulations of CHAWAMPU, and d) participate effectively in the social economical activities carried out by CHAWAMPU. The actual membership, however, strictly limited to those who have irrigated paddy land in the Existing Project area. Out of a total beneficial farmers of 1,876 in the Existing Project area, the number of CHAWAMPU's members are only 783 as of February 1997 as shown in the Table G.1.1.

The reasons why the number of the member is limited are considered as follows:

a) The present CAWAMPU's by-law lacks an article for the mandatory participation of beneficiaries in the CHAWAMPU and in the joint works of O&M planned by CHAWAMPU.

b) When the existing irrigation Project was handed over formally to KADP in 1993, the shortage of water has already existed. Thus, the farmers have complained of little supply of water to KADP,

c) Due to water shortage the frequencies of cultivation was reduce from 3 times per year to only once per year, particularly in the lower reaches of existing irrigaion Project

area. Thus, farmers can't expect high income, and they don't want to join CHAWAMPU and don't want to make contribution of share and member's fee, and

d) Before 1993 the Government used to shoulder all expenses for the operation and maintenance of the Existing Project, except land preparation cost and water charge, farmers used to get such governmental services free. After organizing CHAWAMPU all costs necessary for the existing irrigation Project have to be borne farmers themselves through CHAWAMPU, and such cost jumped from about US$ 13 per plot in 1992 to US$ 42 per plot in 1996. Thus, farmers hesitate to join CHAWAMPU.

While CHAWAMPU and KADP exerted all their possible efforts to invite paddy farmers, the results fell short of their expectation due mainly water shortage. Furthermore, CHAWAMPU can't stop supplying water into non-member's paddy plots. CHAWAMPU has now discriminated against the cultivation fee per plot(0.3 ha) for members of Tsh. 2,600 and non-members of Tsh. 2,900 so as to abate the economic unfairness between members and non-members.

(d) Activities of CHAWAMPU

Under the Existing Project, the farming practice centering on irrigated paddy cultivation has been developed. An average yield of 6.6 ton of paddy per hectare from 1985 to 1996 was attained, which largely contributed to increase of beneficiaries income. Recently, the outside farmers living upstream the existing irrigation Project have reclaimed the upstream area by themselves. The total reclaimed areas are estimated at about 470 ha, with Njoro area of 140 ha and Mandaka Mnono area of 330 ha. The water resources on the reclaimed paddy fields are tapped from Rau and Njoro rivers which are the due water sources for the Existing Project. The cultivation areas in the Existing Project have been suffering severe shortage of irrigation water due to combined prolonged drought in late years and farmers' selfish use of water, especially in Mabogini area of the Existing Project. Consequently, the cultivated paddy area has gradually declined year by year, and decreased to only 468 ha in 1995, which is about one third of 1,525 ha cultivated at the peak time of 1990. Paddy cultivated areas, production quantity, average yield and estimated gross farmers' income are shown in Table G.1.2.

Under the condition of the paddy cultivation activities in the Existing Project area described above, CHAWAMPU undertakes the following activities: (a) execute all activities related to paddy production, i.e. farm preparations; plowing, seedling and transplanting; distribution of irrigation water; collection of water charges; operation and maintenance of canals; procurement of fuel for farm machinery and vehicles; (b) marketing of agricultural inputs, (c) coordinating its activities among the agencies concerned including KADP, RAS, DALDO, WUAs etc., and (d) settling the troubles among CHAWAMPU members.

With regard to the commercial activity, CHAWAMPU has established a retail shop for selling agricultural input. The fund for the shop was raised from the capital and member fees. The agricultural input procured by CHAWAMPU includes fertilizers and agro-chemicals. The input is procured at the Tanzania Fertilizers Company (TFC) and Tanzania Farmers Association(TFA) all situated in Moshi town.

Quantity of fertilizers purchased and sold in the period of 1994 to 1977 are as follows:

Quantity of fertilizers purchased and sold by CHAWAMPU

Year	Purchased (tones)	Sold (tones)	Balance (tones)
1994-1995	20	20	-
1996	30	20	10
1997	15	5	20

Source: CHAWAMPU shop

The following is theagricultural inputs' price list of CHAWAMPU for buying and selling :

Inputs	Quantity	Buying Price (Tsh.)	Selling Price (Tsh.)
(1) Fertilizers			
- Urea	50kg	10,500	11,700
- ASA	50kg	5,920	6,800
- NPK	50kg	14,640	16,600
(2) Agro-chemicals			
- Basud	liter	9,300	10,000
- Norathion	2liters	15,000	20,000
- Booster	liter	1,900	3,000
- Roster	liter	13,400	14,400

Source: JICA Study team/CHAWAMPU shop as of May 1997.

The quantity of fertilizers procured is estimated based upon the projections of farmer requirements of a given season. Reason why fertilizers remain unsold results from the liberalization policy enacted in 1990 where several shops and organization are privately dealing on the same business. There are about five (5) shops selling agricultural inputs in the CHAWAMPU operational area. These includes three (3) shops in Mabogini village, one shop in Chekereni (Uwanja wa mbuni) and other in Kahe. It can be seen that the prices of agricultural inputs selling at CHAWAMPU's shop are little bit higher than that of other shops, i.e. Uwanja wa mbuni.

However, CHAWAMPU's shop have managed so far to record net profits in the period illustrated below:

Period	Net profit (Tsh.)
1993-1994	1,277,119
1994-1995	1,594,804
1995-1996	1,368,411
Total	4,240,334

Source: JICA Study Team/CAWAMPU's shop.

The CHAWAMPU's annual budget for commercial sector from 1993 to 1997 is shown in Table G.1.3.

(3) Relationship between KADP and CHAWAMPU

During the project type of cooperation, the running costs for KADP including personnel expenses were borne by GOT with the subsidy in terms of machinery and spare parts from GOJ, while the paddy farmers were paying a very small amount to the Government for the machinery costs and water charge(Tsh. 4,200/only per plot). In order to smooth communicate with the farmers and KADP, WUAs used to be organized in each village. Both of land preparation fee and water charge were collected from the farmers through WUAs.

Under the Economic Recover Programme, the government of Tanzania decided to withdraw from providing assistance to economic generating activities including the existing irrigation Project. In other words, the irrigation schemes operated by the Government will be handed over to WUAs hereafter without any financial assistance. In March 1993 CHAWAMPU succeeded to WUAs has been organized as a cooperative society to cope with the above situation.

However, the ownership of irrigation facilities except water right as well as the property of KADP including machinery, workshops etc., has not been handed over officially to CHAWAMPU, and still belonge to the Government (RAS). The water rights for Mabogini intake from Goa and Njoro springs (804 liters/sec) and for Rau River intake (1,150 liters/sec) were transfered to CHAWAMPU from RAS in 1995.

Therefore, the management of irrigation water distribution in the Existing Project carry out under the closed cooperation between KADP and CHAWAMPU. The intake water gate, main canals and secondary canals are controlled by KADP. Thereafter tertiary and water course canals are controlled by CHAWAMPU's watermen. As for the implementation of paddy farming, the Implementation Committee consisted of KADP staff, CHAWAMPU board members and village leadership hold once a month for discuss/approve the major topics regarding paddy cultivation. The Committee is held under the presidency of the director of KADP.

The KADP is now no budget for running the Existing Project, while the personnel expenses for a total staff of 67 counterparts are disbursed from the national treasury. The actual costs for operating the Existing Project have been paid out by farmers through CHAWAMPU. CHAWAMPU plans its revenue and expenditure for operating the exising Project in each year and gets approve at the general meeting. In case of the revenue, an estimation will be done with a cultivation charge of Tsh 26,000/plot (0.3 ha). Table G.1.4 shows the revenue and expenditure plan for the Project operation of 1997.

(4) Countermeasures against infringement of water right, and penalties on offenders

Recently, the farmers living outside of the Existing Project area, have reclaimed the upstream area of the Rau and Njoro rivers by themselves. The water resources on the reclaimed paddy fields are tapped from Rau and Najoro rivers which are the due water sources for the Existing Project. The cropped areas in the Existing Project have suffered severe shortage of irrigation water combined with farmers' selfish use of water especially in Mabogini area. Consequently, the Existing Project areas have suffered serious water shotage. In order to cope with this situation, KADC and CHAWAMPU considered together a plan keeping closed contact with lawyers and authorities concerns.

As the result of the efforts of all the authorities concerned, the Moshi District Council By-Laws of 1995 with a title of the Regulation of Agriculture in the Lower Moshi Irrigation Development Project, has been formulated on 16th June 1995, in accordance with the Local Government Act No. 7 of 1982. The Moshi District Council By-Laws is compiled in ATTACHMENT-G.2.

The purpose of the by-laws is to effect efficient and rational operation and maintenance of the facilities, agricultural land and water sources created under the Existing Project.

The synopsis of the by-laws are as follows:

(a) Duties of the Project office

The duties of the Project office shall include (i) operation and maintenance of the major project facilities, and (ii) providing the Project beneficiaries with full technical assistance.

(b) Operation plan

The Project beneficiaries who hold agricultural land within the Project area shall execute farming operations strictly in accordance with the irrigation plans, cropping schedules and other rules set out by the Project office and approved by the District Council and CHAWAMPU.

Irrigaion water created by the Project and conveyed with the use of the Project facilities shall not be delivered to any land except that entitled to receive it.

The agricultural land shall be entitled to receive irrigation water in accordance with the predetermined irrigation schedule.

(c) Collection of water charge

CHAWAMPU shall collect from the Project beneficiaries all water charge acording to the Water Management Act 1974.

(d) Cropping plan

Any agricultural land shall be utilized strictly in accordance with the cropping plan and schedule prepared by the Project office and approved by CHAWAMPU.

(e) Cultivation fee

Every Project beneficiaries has to pay cultivation and any other charges as may have been determined by the CHAWAMPU before the start cropping schedule.

(f) Offences

Any Project beneficiary who contravenes any of the provisions of the By-laws shall be guilty of an offence and may be liable to punishiment.

- In case of first offender, a fine not exceeding three thousand shillings or imprisonment for a term not exceeding one year or both fine and imprisonment.

- In case of second offender or subsequent violation of these regulations, in addition to the above penalty, the offender may be barred from the cultivation of the agricultural land for a period not exceeding three years.

(g) Taking water without authority

Any person or Project beneficiaries who takes water without authorization, or break the operation rule may be sentence to a fine not exceeding three thousand shillings or six months imprisonment or both fine and imprisonment.

Up to the end of 1996, 64 Project beneficiaries particularly in Upper Mabogini area were sued as offenders of the by-laws by CHAWAMPU, and 13 beneficiaries of the 64 were ruled the by-laws as unconstitutional. The break down of the decision of the court is given as follows:

Decision		No. of beneficiaries
Imprisonment of 4 months		7
Fine:	Tsh. 9,000	3
	Tsh. 6,000	1
	Tsh.3,000	2

Source: CHAWAMPU

While all legalistic preparations have been completed there are still many offenders who breaks cropping plan and schedule, pays no water charge,etc. The farmers who breaks cropping plan are mainly in Upper mabogini area because their paddy area are located nearest to the water source, and will pay for their cultivation even if they pay the fine set out in the by-laws.

Furthermore, the present by-laws of the Moshi District Council seems to have the following limitation in future;

- Present by-laws are not applicable to Hai district administrative area where the headworks on the Kikuletwa river and diversion channel will be constructed.

- Under the by-laws, the Project office that means an office established for the purpose of the operation and maintenance of the Project is supposed to be KADP. When all Project's facilities and their operation and maintenance power transfer to CHAWAMPU under the irrigation policy of the GOT, the amendment of the by-laws will be required. Furthermore, when al Project's facilities belong to CHAWAMPU as private properties, it is very questionable whether the by-laws under the Local Government Act be applicable to a private irrigation project with the article of penalty.

(5) Constraints and Problem

Except physical constraints like water shortage, deterioration of irrigation facilities etc., the following seems to be problems from the institutional/farmers organization point of view:

(a) Low participation rate of CHAWAMPU

The CHAWAMPU's membership is only 783 or 42% of the total paddy farmers of 1,876, as of February 1997. The problem of low membership could be derived from the principle of primary cooperative society under the Cooperative Society Act, 1991. While CHAWAMPU has been registered as a "primary cooperatives societies", its functionality is entirely different from an ordinary cooperative society which member joins voluntarily with an object of promoting the economic and social welfare of the members. The irrigation organization should be on compulsory administration basis under a mandatory regulation.

(b) Existence of many offenders

At present, normally irrigation water is provided at a four days interval. Sometimes selfish farmers, even if they are members of CHAWAMPU, fill more water in their own plots or give bribe to the waterman to fill more water in their plots. This cause problems in CHAWAMPU.

(c) Imperfect CHAWAMPU's by-law

The present by-law of CHAWAMPU is insufficient in terms of operation and maintenance of irrigation scheme, particularly in its objective, membership, members' duty and so forth. These insufficiency may partly contribute to induce the problems that CHAWAMPUis now facing.

(d) Organizational weaknesses

Organization strengthening of WUA/WUG is a key aspect in training needs of farmers. A week organization will automatically produce weak farmers, conflictive water distribution plans, weaknesses in the enforcement of by-laws and mismanagement of the organization.

(e) Lack of solidarity as a rural community

Another problem is that the paddy farmers living in the villages in the Existing Project are only 983 or 50% of the total 1,876 farmers. Furthermore, a considerable number of land owners lease their paddy lots to others, and borrowers usually employ a manager to cultivate their land by using wage labors. Therefore, the farmers/cultivators in the Existing Project don't know well each other. Under such situation, any economic and social solidarity, that are essential for maintaining the Existing Project, will be difficult to create.

(f) Weakness of KADP

KADP has now no budget for running the Existing Project, while the personnel expenses for a total of 67 staff counterparts are disbursed from the national treasury.

The actual costs for operating the Existing Project have been paid out by farmers through CHAWAMPU.

(g) Sudden increase of cultivation charge

During the Japanese Project type of cooperation, the farmers paid only Tsh. 4,200/plot composed of water charge and machinery costs. After termination of the cooperation, the farmers have to be paid Tsh.26,000/plot which means six times greater than before. This caused misunderstanding and distrust to CHAWAMPU among some farmers coupled with the water shortage, and affected negatively to CHAWAMPU.

1.2.3 Water Users'Association/Group (WUA/WUG)

In the Study Area, there are two existing irrigation schemes; namely the Njoro Kwa Goa irrigation scheme in the upper stream of Njoro, administratively located in Kaloleni ward, Moshi municipal and the Mandaka irrigation scheme located in Mandaka Mnono village.

(1) Njoro Kwa Goa irrigation system

The irrigation facilities of Njoro Kwa Goa irrigation scheme were constructed by farmers themselves voluntarily without any governmental financial assistance. At the time of the begining of 1980s, about 80 ha of paddy fields were already developed in Kaloleni ward with a water source of Njoro ya dobi and Goa springs. After that the irrigation area expanded gradually in particular shortly after the completion of the Existing Project. The total irrigated area of Njoro Kwa Goa scheme now reached about 138 ha with a total land holders of 190. Administratively the area is governed by the Kaloleni ward situated in Moshi municipality. The irrigated area, however, is cultivated by farmers from Kaloleni, Pasua, Majengo, Mabogini and Kiusa villages. Due to water shortage only 80 ha is used for paddy cultivation at present and the rest for other crops i.e. maize, beens, sesame etc. The scheme has three major irrigation canals as shown below:

Canal	No. of Farmers	Irrigated Area(ha)
No 1	103	79
No 2	51	35
No 3	36	24
Total	190	138

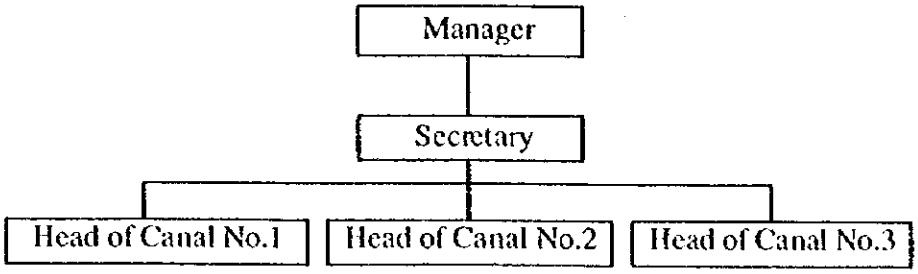
Source: JICA Study Team

At present the Water Users Association(WUA) have already applied for the water right to the ministry of Water, Kilimanjaro department under the Water Act of 1974 because the GOT announced in 1994 that water right is transfered to either WUAs or village governments where water is actually used. Thus, according to the manager of the WUA, the WUA has paid water charges based on the customary water right to the water department a total amount of Tsh.110,000 up to date, which consists of Tsh.40,000 in 1996 and Tsh.70,000 in 1997. Farmers from Njoro Kwa Goa pay a flat rate water charge of Tsh.600 to 1,000 per year depending on the paddy block they cultivated. They annually pay Tsh.600 for Block No.1 and Tsh.1,000 for Block No.2 and No. 3

In Njoro Kwa Goa scheme, a WUA has already been organized with laying down its by-law, but not registered yet. The by-laws have a strong binding force on the farmers, even though these have no legal background to support them. The by-laws of the WUA have been authorized by the village community, and almost all farmers follow such by-laws.

The WUA comprises of five (5) persons as indicated below:

Organization structure of Njoro Kwa Goa Scheme



The functions of the WUA are as follows:

- To ensure irrigation water and distribute equaly to farmers;
- To make and ammend by-laws,
- To collect water charge from the beneficiaries,
- To operate and maintain properly farm canals, and
- To network with other similar organizations such as CHAWAMPU.

In the WUA's by-laws, the following items have been laid down as the private rules among the members;

(a) Every farmer cultivating in the area has to participate effectively in the operation and maintenance of the Njoro Kwa Goa and Dobi Springs and irrigation canals. Failure for that a famer shall be penalised to do the same activity twice or shall not receive irrigation water.

(b) Operation and maintenance of the springs and paddy canals shall be done in every Sunday associated with farmer meeting through paddy growing seasons.

(c) The supplying schedule of irrigation water to the agricultural land shall depend on the location where a famer posses.

(d) Any person who takes water without authorization may be sentenced to a fine not exceeding five thousand shillings in the first offender; In case ofsecond offender in addition to the penalty mentioned above, the offender will be taken to the Kaloleni ward executive officer for further actions.

(e) Any person who destroy the irrigation structures shall be guilty of an offence and may be punished to pay a fine not exceeding ten thousand shillings.

(f) Any farmer wishes to see the waterman for irrigation schedule shall contact him without holding agricultural tools such as hand hoe etc. to avoid violence may be occures between them.

The farmers in Njoro Kwa Goa are in the process of formulating their own organization to be named as "Njoro Kwa Goa Farmers Association". The main objectives of this association are:

- To collect water charges for irrigation purposes,
- To handle properly all problems related to paddy production,
- To facilitate in obtaining agricultural inputs, credit facilities, extension services and to have reliable marketing for paddy, and
- To acquire legal status of operating and maintain both Njoro Kwa Goa and Dobi springs.

The proposed organization of this association is composed of one chairman, one secretary, and four (4) water committee members.

(2) Mandaka irrigation scheme

As same as the Njoro Kwa Goa Scheme, about 250 ha of paddy fields were developed in Mandaka Mnono village in the beginning of 1980s, with water source of Mwananguruwe spring and the Rau river, and after that the irrigation area expanded gradually, particularly

shortly after the completion of the Existing Project. At present about 330 ha of irrigated paddy field with primitive irrigation facilities has been developed. Of which only 177 ha have been cultivated for paddy by 350 farmers and the rest of 152 ha are for upland crops such as maize,etc due to water shortage. The Mandaka WUA have neither official water rights nor applying an application for registration of the water right yet, but the WUA has considered that it has had traditional unwritten water rights.

Mandaka Mnono village has three paddy blocks namely Makarare, Mwananguruwe and Uswahilini. There are the two major canals supplying water to the blocks, Saningho and Cenema canals.

(a) Saningho canal

The canal is supplying water to Uswahilini block which is divided into two sub-blocks namely;

- Uswahilini upper comprised of about 21 ha and cultivated by a total of 30 farmers.
- Lower Uswahilini composed of 16 ha including the "Torosi area". There are about 20 farmers.

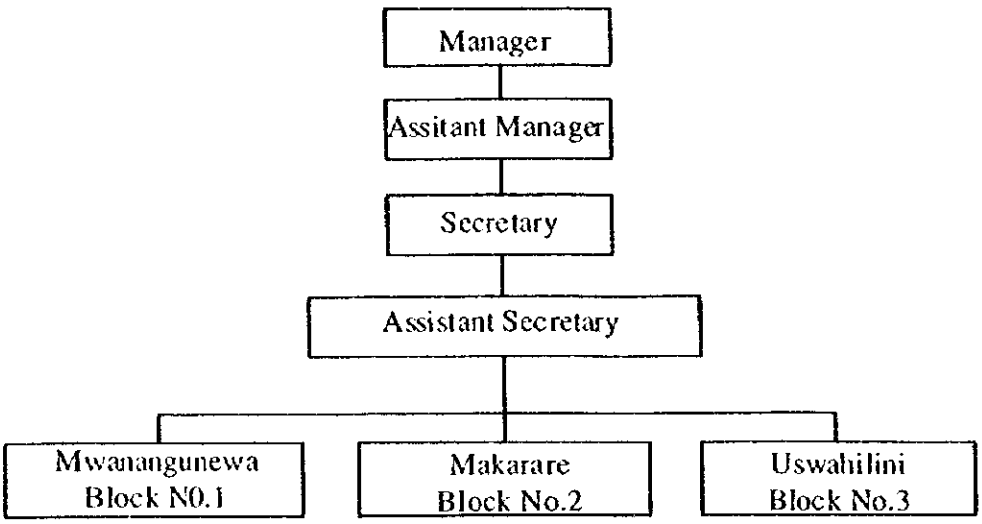
Saningho is also having a total of 152 ha used for maize, beans, and sesame crops. Paddy is not cultivated due to long droughts and floods during the raining seasons.

(b) Cenema canal

The canal is supplying water to Makarare and Mwananguruwe blocks. The Makarare paddy farms comprised of 92 ha with a total of 170 farmers, while Mmwananguruwe paddy farm comprised of about 48 ha with a total of 130 farmers.

WUA has already been organized, but not registered yet. The irrigation facilities are operated and maintained by the WUA under the control of the village's Production Committee. The Production Committee, which consist of a total of 24 members, divided paddy fields into 3 blocks on the basis of the canal command areas mentioned above; Mwananguruwe, Makarare and Uswahilini, and organized one WUA, under which Water Users Group(WUG) has been organized in each block. The WUA consistes of the manager, the assistant manager, the secretary, the assistant secretary, and five members from each block. Each block has a chairman, secretary and three representatives. The manager and the secretary are elected at the farmers' annual general meeting; and the five representatives are elected at their blocks. The organization structure of the Mandaka WUA is shown below.

Organization Structure of Mandaka WUA



The function of Mandaka WUA are as follows:

- To ensure adequate water for irrigation purpose,
- To supply water to paddy farmers in the village,

- To make and amend by-laws,
- To prepare a time table for water use in paddy farmers, and
- To collect water charges for operation and maintenance of irrigation facilities.

Mandaka WUA has no written by-law and regulations, and the following are the traditional by-laws used by the Production Committee in Mandaka Mnono village:

(a) It is prohibited to cultivated paddy without following WUA's members' obligation of the village production committee.

(b) Every farmer is required to participate effectively to the farm preparations and in the operation and maintenance of the canals.

(c) Each block shall follow the dates/period of seedling and transplanting except of swamp areas.

(d) Each farmer shall use water according to the time table issued by the production committee.

The penalties applied are as follows:

(a) Any farmer breaks irrigation rule a) above shall be sentenced to a fine not exceeding Tsh. 5,000 and shall not receive water up to the time of his allocation.

(b) Any farmer breaks irrigation rule b) and c) above shall be sentenced to a finenot exceeding Tsh. 3,000.

(c) Any farmer who breaks rule d) above and takes water without authorization may be sentenced to a fine not exceeding Tsh. 10,000.

(d) Failure to that, the crops valued the same fine after harvesting shall be charged together with disturbance costs.

These by-laws have been made and amended by the farmers themselves at their annual general meeting and approved by the village administration council. Farmers from Mandaka scheme pay Tsh. 500 per year for irrigation purpose. Furthermore the villagers also participate in communal works, especially in operational and maintenance of village canals.

(3) Constraints faced by WUAs

The farmers in the two irrigation schemes of Mandaka Mnono and Njoro Kwa Goa have a long experience in irrigated farming. Their irrigation schemes were constructed by the farmers themselves. WUAs were organized after the construction of irrigation facilities, and these two WUAs have functioned and carried out O&M of the facilities within their capability. However, these two WUAs has faced many problems for carrying out O&M effectively. The followings are the major constraints facing both existing WUAs commonly;

- Financial constraints
- Inadequate irrigation water supply,
- Floods which bring mud into the irrigation canals, etc.,
- Lost of water due to unproper construction of the irrigation facilities including canals, and
- Lack of technical know-how in operation and maintenance of irrigation facilities.

Considering the above situations, Mandaka Mnono village has now expected to do the followings:

(a) To request the assistance from GOT, external donors and financial institutions forconstructing modern irrigation facilities, and

(b) To collect moneys from farmers and to establish a water fund in the village to be used for the operation and maintenance of irrigation facilities, etc.

1.2.4 Other Organizations

Women and youths groups/organizations will be two major groups observed over the country as a whole. The GOT has now encouraged the formulation of women/youths organizations as the vehicles of women and youths development: Ministry of Community

Development for women and Ministry of Labor for youth. In the Kilimanjaro region, there are some 45 women/youths organizations mainly registered under the Society Ordinance of 1954 with a total members of 7,765 as shown in Table G.1.5 and summarized as bellow:

District	No. of organizations	No. of members
Moshi Municipal	10	3,000
Hai	8	1,115
Moshi Rural	10	1,420
Rombo	4	1,350
Mwanga	8	500
Same	5	380
Total	45	7,765

Source: Community Development Department, Kilimanjaro region 1996.

The Kilimanjaro Women Development Association(KIWODEA), the Shujaa wa Kupiga Umaskini Vita(SKUVI; poverty alleviation association), Kilimanjaro, Association for Community Development (KACD), and the Center for Informal Sector Promotion (CISP) are typical organizations which aim at women and youths development, and each of them is a Non-Governmental Organization(NGO).

In the Study Area, there are many women and youth groups organized under the guidance of governments and/or by women or youth themselves. However, these groups have not been registered yet except Sia Yako group in Chekereni village. The membership of a group is less than 35. The general structure of the women/youths organizations comprise of: chairman, vice chairman, secretary, treasurer/ accountant, and members. Most of the activities done by the women/youths groups in the area are of small scale income generating activities which includes agriculture, gardening, petty business, tailoring, carpentry and bricks making etc.

These groups are all facing similar problems i.e. insufficient capital, lack of technical skills in business management, lack of leadership, and insufficient markets. The list of these groups in the Study Area is shown in the following table:

Other Farmers' Groups in the Study Area

Village	Name of Group	Classification*	Year Established	No. of Members	Acctivities Carried
Mabogini	Tumaini Kina Mane Mabogini	W.O	1990	17	Brick making, maizu cultivation
	Umati-CBS	C.B	1994	30	Paddy cultivation
	Juhudi	W.O	1995	4	Paddy cultivatioo
	Kamonyola Bricks supply	Y.O	1996	6	Brick making
Chekereni	Sia-Yako	W.O	1992	30	Vegetable gardening
	Wanja wa Mbuni	F. A	1990	378	Selling of agricultural inputs
Mtakuja	Umoja wa Wanawake Tanzania	W.O	1993	32	Selling of local brew
	Mutakuja Youth	Y.O	1993	15	Brick making, capentry
Mvuleni	Umoja wa Wanawake Tanzania	W.O	1990	30	Petty Business
	Muvuleni Youth	Y.O	1992	20	Petty Buisiness, carpentry
Rau Ya Kati	Youth Capentry Group	Y.O	1995	5	Carpentry
	Rau River Youth Group	Y.O	1996	5	Selling agri-inputs, retail shop
	Rau River Women Group	W.O	1996	5	Tailoring
Oria	Umoja wa Wanawake Tanzania	W.O	1986	30	Petty Buisiness
	Oria Youth Club	Y.O	1994	10	Brick making, carpentry
Mandaka		No - Groups			
Njoro Kwa Goa	Umoja wa Wanawake Tanzania	W.O	1982	25	Petty buisiness, taoiloring
	Shujae wa Kupiga Vita Umaskini	Y.O	1995	50	Paddy cultivation,petty bussiness

Remarks * W.O= Women Group, C.B= Community Base Group (Both Sex), Y.O= Youth Group, F. A= Farmers Organization
Source: JICA Study Team

2 AGRICULTURAL SUPPORTING SERVICES

Agricultural supporting services in the Study Area have been functioning in various fields such as research, extension, training, supply of farm input, credit, etc., involving some assistance of international organization and NGOs, such as IDA, UNDP/FAO, etc.

2.1 Research, Extension and Training

2.1.1 General Condition in Kilimanjaro Region

(1) Research

Tanzania is divided into 7 research and training zones. In each zone, various research institutes and research centers have been established, depending on specified subjects concerning crop and livestock.

The Agricultural Research and Training Institute(ARTI) has specific mandate to implement various research work on crop and livestock for the relevant regions and also coordinates nationwide research work for maize, sorghum, millets, grain legumes (cowpeas, greengram, soybeans, and pigeon peas), sunflower, and crop protection.

The major ARTIs by crops are as follows:

Name	Location	Objective Crops
(a) Ukiriguru	Mwanza Region	Cotton & Root crops
(b) Ilonga	Morogoro Region	Maize & Pulse crops
(c) Lyamungo	Kilimanjaro Region	Coffee
(d) Mlingano	Tanga Region	Sisal & Coconuts
(e) Naliendele	Mtwara Region	Groundnuts
(f) Kibaha	Coast Region	Sugarcane
(g) Maruku	Kagera Region(Bukoba)	Bananas

With regard to rice, Kilombero Agricultural Training and Research Institute(KATRIN) are stationed in Ifakara district, Morogoro region has carried out research work under the National Rice Research Coordinated Program in collaboration with other research institutes and centers. Breeding and seed multiplication of rice cultivars are also one of the important functions of KATRIN. In addition, Sokoine University of Agriculture(SUA) which was established in 1984 by Act NO. 6 of the parliament of Tanzania is also carrying out rice research. The activities of rice research at SUA have always been part of the National Rice Research Coordinated Program. Under the Program, there is a modest breeding program which involves, varietal testing and selection, some hybridization and mutation breeding. Some agronomic work mainly on herbicide trials are also carried out.

Kilimanjaro region is grouped into the Northern zone which covers Kilimanjaro and Arusha regions. There are three ARTIs: Selian and Tengeru ARTIs locatrd in Arumeru district in Arusha region, and Lyamungo ARTI located in Lyamungo district in Kilimanjaro region. Selian ARTI have rather concentrated upon wheat and beans than on other crops, Tengeru ARTI upon horticulture and livestock sectors, and Lyamungo ARTI upon coffee, respectively.

For a long time now, research programs have been facing numerous operational and institutional problems. These include inadequate financial resources, lack of trained research personnel and physical facilities.

(2) Extension

Dissemination of information about improved technologies and farming practices is essential for the development of agriculture. Smallholder agricultural extension services, however, are not effective in Tanzania. Many extension department are underfunded and unable to react to specialized technical requests. Management supervision is also weak, with

field personnel receiving little feedback from the visits of their supervisors. In addition, there is a very limited link between research and extension. Consequently extension agents are not kept up to date with improved technologies.

The Ministry of Agriculture and Cooperatives(MAC) started the National Agricultural and Livestock Extension Rehabilitation Project (NALERP) since 1989/90 with financing from the World Bank (IDA), the African Development Bank (AFDB), and GOT. It has covered 16 regions of Tanzania mainland including Kilimanjaro region. The remaining 4 regions have being supported by IFAD through Southern Highlands Extension and Rural Financial Services Project which started in 1993/94.

The NALERP was aiming at establishment of a cost effective and sustainable agricultural extension service on the Tanzania mainland. During the period of the implementation since 1989/90, it was focused on enforcement of extension system, upgrading the quality of extension officers, and provision of physical infrastructure and logistical support to the system. This phase of NALERP was completed in June 1996.

The National Agricultural Extension Programme Phase II (NAEP II) has been implemented since July 1996 successively as Phase II of NALERP. The objectives of this programme are to continue to improve the delivery of extension service to smallholder farmers in order to improve crop productivity and cost effectiveness as well as farmer's living standard.

The activities of MAC are lead by the Regional Agricultural and Livestock Development Officer (RALDO) at regional level and the District Agricultural and Livestock Development Officer (DALDO) at district level, respectively. RALDO and DALDO are assisted by the Subject Matter Specialists (SMSs) in region and district levels. In principle, SMSs under RALDO and DALDO are composed of extension officer, crop development officer, livestock development officer, irrigation officer, plant protection officer, etc. Current structure in Kilimanjaro region concerning extension activities is shown in Figure G.2.1.

Extension work at regional and district levels is lead by Regional Extension Officer (REO) and District Extension Officer (DEO), respectively. REO and DEO are technically supported by SMSs concerning crop and livestock. Further, Division Extension Officer (DIVEO) is deployed in each division office, in order to coordinate extension activities at division level. Village Extension Officers (VEOs) are deployed to villages.

(3) Training

As for training activities on agricultural field, Ministry of Agriculture Training Institute (MATI); Lyamungu is located in Kilimanjaro region. The institute have functions on education for farmers and refresher courses for VEOs.

Retraining programme for village extension officers has been started since 1994, sponsored by NALERP.

Other agriculture training are carried out by Folk Development College in Same(Same district) and Msinga(Moshi rural district).

In 1994, Kilimanjaro Agricultural Training Center (KATC) has also been started with the Japanese technical assistance. The KATP's former training facilities belonging to Regional Adminstrative Secretary(RAS) of Kilimanjaro, were transferred to MAC(KATC) in July 1994, with the aim of strengthening the technical capability of extension personnel and key-farmers over the whole country on irrigated rice farming.

2.1.2 Research, Extension and Training Activities in the Study Area

Apart from the national agricultural supporting services mentioned above, an aggressive research, extension and training activities have been carry out in the Existing Project area, mainly through KADP with the Japanese technical assistance.

(1) Research and extension

The Kilimanjaro Agricultural Development Center(KADC) was established in 1981 to conduct training for farmers and extension staff who worked in areas surrounding the Existing Project. Construction of KADC's Trial and Pilot Farm was also completed in 1982/83 with the purpose of conducting verification trials and experiments to find the best seed variety adaptable to the Kilimanjaro area.

Through the verification trials about 40 types of seeds were tested for adaptability and IR-54 scored highest for all qualities required. The IR-54 variety has been widely adopted by farmers not only in the Project area but also in many places in Northern Tanzania where irrigation water can be obtained.

Kilimanjaro Agricultural Development Project(KADP), succeeded KADC, has now concentrated on expanding technological know-how in the Existing Project area. The rice cultivation techniques developed by the KADP/KADC reflects the main components of rice farming methods. The five main components are:

(a) Variety:

Improvement from the production of 1.8 - 2.5 tons/ha by using the traditional varieties to the production of 6 tons/ha using IR-54 as practiced tat present.

(b) Fertilizer:

The use of fertilizers at the current rates of 40 kg. P_2O_5/ha and 150 kg N/ha which are necessary and compatible with IR-54, a variety highly sensitive to fertilizer application.

(c) Modern Irrigation:

Moving from the traditional irrigation furrows to a modernized irrigation system.

(d) Extension:

Utilizing an intensive agricultural extension system using the Training and Visiting(T. & V.) method of approach in order to help farmers to change their attitude and apply improved farming practices.

(e) Farmer's Organization:

Establishing formal groups up to rural cooperative level which would deal with daily household problems of the farmers thereby creating abilities of safeguarding and managing the project infrastructure.

Regarding to the extension, KADP draws its professionally trained staffs from the MAC through RALDO. There is a close connection between KADP's staff and the staff of other related offices under MAC for the exchange of basic information regarding their day-to day activities. The exchange of information is made during routine meetings in which they discuss technical matters for mutual benefit. The DALDO has assigned one Extension Officer(VEO) in each of the four villages in the Existing Project area. These officers cooperate with the staff of the KADP on the matters concerning the development of the Existing Project.

In principle, VEO is deployed at each village in order to disseminate proper farming technology and give advise to farmers. At present, the total number of VEOs is 7 covering the relevant villages in the Study Area such as Mabogini, Chekereni, Rau Ya Kati, Oria, Mtakuja, Mvuleni(New Land), and Mandaka Mnono. In the Existing Project Area, extension activities between VEOs and KADP's extension staffs are basically demarcated by crops; VEOs dealt with upland crops and KADP's staff dealt with paddy.

(2) Training

Training for farmers and extension staff in and outside the Existing Project Area started from 1982, and continued up to 1991. The following table shows the number of trainees and courses conducted at KADC/KADP.

Training Course and its participants (October, 1982 - March, 1991):

Name of Course	No. of Course	No. of trainees Participated
1) Rice Cultivation Course		
a) For extension workers	4	90
b) For farmers	5	157
c) Special courses	2	7
Sub-total	11	254
2) Irrigation		
a) Senior course	3	19
b) Junior course	5	74
c) Extension workers	1	13
d) For farmers	2	31
Sub-total	11	137
3) Upland		
a) For extension workers	5	92
b) For farmers	3	50
Sub-total	8	142
4) Agricultural Machinery		
a) operator course	13	263
Grand Total	44	805

Source: KADP

KATC Project has been operating under collaboration of MAC and JICA. The organization chart of KATC Project is shown in Figure G.2.2. KATC Project has specialized in short courses on irrigated rice cultivation and other related fields. After commencing the activities, the number of trainees and courses conducted at the Center are shown in Table G.2.1 and summarized in the following table:

Training Course and its participants (Aug. 1995 - Feb. 1997)

Name of Course	No. of Course	No. of trainees Participated		
		Male	Female	Total
1) Rice Cultivation Course				
a) For extension workers	3	65	10	75
b) For key farmers	6	134	36	170
Sub-total	9	199	46	245
2) Water Management Course	3	52	4	56
3) Rice Mechanization Course	2	15	0	15
4)Tractor Operator Course	2	17	0	17
Grand Total	16	283	50	333

Source: KATC

2.2 Farm Inputs

2.2.1 General

(1) Seeds

At present, certified seeds represent less than 10% of seeds planted in Tanzania, of which maize hybrid seed dominates high proportion. The market for certified seed is shared by Tanseed, a governmental parastatal, and Cargill, a private sector company. Under the government system, breeder's seeds for maize, sorghum, legumes, and paddy are controlled and sustained in ARTIs and KATRIN. The quality of breeder's seeds is certified in Seed Releasing Committee and the breeder's seeds are released for multiplying foundation seeds to

five (5) foundation seed farms to meet the requirements of Tanseed, that is Kilangali Foundation Seed Farm in Morogoro region, Msimba Foundation Seed Farm in Morogoro region, Arusha Foundation Seed Farm in Kilimanjaro region, Mwele Foundation Seed Farm in Tanga region, and Foundation Seed Farm in Iringa region. The quantity and quality of seeds produced at foundation seed farms has been declined due to several factors including the close linkage with Tanseed, prices set well below production costs, the inflexibility of government management and control, the paucity of funds, deteriorated farm facilities, and lack of a professional commercial attitude. As of 1997, all seed farms stated above have ceased their activities due to privatalization.

(2) Fertilizers and Agro-chemicals

During the years of 1976 to 1988, fertilizer prices in Tanzania were subsidized to varying degrees. In late 1989, the Government decided to phase out the subsidy, starting in 1990 (70% subsidy), and then reducing to 55%, 40%, 25% and to zero from 1994 on.

Up to 1981, of a total fertilizer's requirements in Tanzania estimated at around 150,000 tons or more, the Tanzania Fertilizer Company (TFC) produced around half of the total amount of fertilizers, and the rest was supplied by donor or purchased abroad. Since 1991, when the TFC stopped production due to technical problems, almost all fertilizers consumed in Tanzania are imported abroad, either commercial basis or donated one. Prior to 1992, TFC was the sole importer, producer and distributor of fertilizer. As of 1992, however, the Tanzania Farmers Association(TFA) had imported 20,000 tons, and a private supplier another 45,000 tons. Despite the monopoly at the wholesale level, there were a major change in the retail network. Since many cooperative unions which were main distributors of agricultural inputs have serious difficulties of the financial insolvency, TFC has contracted with private stockists. Thus, stokists have emerged rapidly in the many regions including Kilimanjaro region.

The stockists are in charge of distributing the inputs to the villages through direct selling or through the sale of inputs to private stores located at the villages. The stockists can access to credit from the Agricultural Inputs Trust Fund (AITF) for financing the purchase of inputs.

Agro-chemicals are not produced in Tanzania. The trade depends on imports of final products, or ingredients for local formulation. There are three companies formulating agro-chemicals: Twiga/ICI, Hoeschst, and Tanzania Pesticides Ltd.(a parastatal). The three companies' aggregate annual capacity (6.3 million liters of liquid and 7,800 tons of powder) suppose to be exceeding current consumption level. The activities of local companies have been constrained by: taxation of ingredients and packing; lower cost of imports; and competition from donor-funded commodity import program.

Agro-chemicals are used for coffee, cotton, tobacco, tea , horticulture and maize. In case of coffee and cotton, chemicals were purchased through the both Coffee and Cotton Boards and distributed by the cooperative unions. Payment was deducted from crop receipts after harvest . From 1988 on, the two Boards have faced financial constraints and have been unable to sustain the same levels of purchase. Smallholders producing cereal crops and horticulture crops usually purchase agro-chemicals at agricultural cooperatives and/or retailers.

2.2.2 Present Condition in the Study Area

(1) Seeds

Rice seeds were produced on the pilot farm by CHAWAMPU and supplied to farmers from 1993-95. The production was then abandoned up to date due to high production costs of rice seeds. At present farmers in the Study Area are produce their own rice seeds (IR54). However, a few good farmers in the Existing Project Area purchase rice seeds from a famous farmer who is engaging in rice seeds production in Rau Ya Kati village.

CHAWAMPU plan to conduct a cost analysis on rice seeds production. If a bright prospect is expected, then CHAWAMPU again will produce seeds and supply them to farmers.

With regard to maize seeds, about 60 % of farmers in the Study Area grow local maize varieties using their own seeds reserved after harvesting. The rest of farmers(about 40 %) use hybrid seeds purchase from dealers in Moshi town.

The reasons why many farmers prefer to use local seeds is explained as follows:

- Local vrieties are cheaper as farmers can reserve seeds after harvesting.
- Local varieties are useful for brewing local brew.
- Certified seeds are not useful for milling.

The hybrid maize seeds which are more popular and easily obtainable in Moshi town are as follows:

Variety	Yield/ha (100kg/bag)
Slow maturing varieties;	
CA 4141	35-40 bags
CA 4142	35-40 bags
Kilima	35-40 bags
Early maturing varieties;	
Tuxpeno	20 bags
Kito	16 bags
Katumeni	8 bags
Steha	20 bags

Source: JICA Study team

(2) Fertilizer and Agro-chemical

Fertilizer and agro-chemical can be bought at the shops located in the Study Area and Moshi town. There are five (5) shops selling agricultural inputs in the Study Area. These includes three (3) shops in Mabogini village, one shop in Chekereni (Uwanja wa mbuni) and other in Kahe. In case of CHAWAMPU shop, the agricultural inputs are procured at TFC and TFA situated all in Moshi town. Other shops usually procure their supply in cash from retail dealers in Moshi town.

Inputs sold to farmers by these shop are at high price than that of retail shops in Moshi town due to transportation charges and other expenses running the shop. While the farmers are aware of the higher prices, they are willing to buy at these shops located in the Existing Project Area because they don't have any transportation facilities.

(3) Inputs Supply Problems

In the Study Area, especially in the Existing Lower Moshi Project Area, it can be said generally that there are no serious constraints except the following matters:

(a) As the government is no longer subsidizing the agricultural inputs the prices have become higher and some farmer can not afford it due to financial constraints. Furthermore, fertilizers and agro-chemical are of relative high prices as compared with crops prices. This discourage farmers from using them.

(b) Some inputs are not available at a required time due to the exhaustion of stock.

(c) In case of agro-chemical, occasionally some dealers sell products that have already expired the time indicated as suitable for their use.

(d) Transportation of inputs is difficult due to the bad conditions of the roads andlack of adequate transportation facilities for some villages like Mandaka Mnono.