



**TOGETHER**  
*for a sustainable future*

## OCCASION

This publication has been made available to the public on the occasion of the 50<sup>th</sup> anniversary of the United Nations Industrial Development Organisation.



**TOGETHER**  
*for a sustainable future*

## DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

## FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

## CONTACT

Please contact [publications@unido.org](mailto:publications@unido.org) for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at [www.unido.org](http://www.unido.org)

16506

Distr.  
RESTRICTED

PPD/R.9  
13 August 1987

UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION

ENGLISH

---

CO-OPERATIVE FOOD INDUSTRIES ASSESSMENT OF THE PRESENT  
SITUATION AND FUTURE POTENTIAL

XP/INT/86/007

TANZANIA

Technical report: Food-processing activities in Tanzania\*

Prepared for the Government of Tanzania  
by the United Nations Industrial Development Organization

Based on the work of Björn Almquist, UNIDO consultant

Backstopping Officer: L. E. Rojas, Section for Co-operation with  
Non-governmental Organizations and Industrial Enterprises

---

\* This document has been reproduced without formal editing.

TABLE OF CONTENTS

	<u>Page</u>
Summary	3
1.0 Introduction	4
2.0 Agro-Industries in Tanzania	6
2.1 The Government sector	
2.2 The private sector	
2.3 The co-operative sector	
3.0 The Co-operative Movement in Tanzania	7
3.1 History in brief	
3.2 Present status of the co-operative	
4.0 Establishment of Agro-Industries, Regulations, Assistance	8
4.1 Licences	
4.2 Assistance	
5.0 Information and Impressions from Visits to Co-operative Unions	9
5.1 Kilimanjaro Native Co-operative Union, KNCU	9
5.1.1 Agriculture	
5.1.2 Agro-industries	
5.1.3 Plans for the future	
Central coffee pulping units	
Oil mill	
Fruit and vegetable processing plant	
Dairy plant	
5.2 Arusha Region Co-operative Union, ARCU	12
5.2.1 Agriculture	
5.2.2 Agro-industries	
5.2.3 Plans for the future	
The maize mill	
Oil mills and feed industry	
Central coffee pulping units	
5.3 Morogoro Region Co-operative Union, MRCU	15
5.3.1 Agriculture	
5.3.2 Agro-industries	
5.3.3 Plans for the future	
6.0 Food Processing Industries by Region	17

	<u>Page</u>	
7.0	Comments and Considerations	19
7.1	Fruit and vegetable processing industries	
7.2	Maize mills	
7.3	Oil mills	
7.4	Dairy plants	
7.5	Livestock trading, slaughtering and meat processing	

Appendix

1	Plants visited in ARCU area	23
	1 Maize mill	
	2 Feed processing plant	
2	Plants visited in MRCU area	25
	1 MOPROCO Vegetable Oil Mill and Refinery	
	2 Kilosa Ginnery	
	3 Kilosa Oil Mill	

S U M M A R Y

The co-operative food industry in Tanzania is just emerging. The existing plants are few in number and in need of rehabilitation and strengthening of the managerial, operational and maintenance resources.

Development of the food industry is part of the strategy for diversification of the co-operative movement, aiming at improving the market outlet, stabilizing producer prices, and adding value to the farm commodities, thereby generating funds for further integration in the future.

A number of project opportunities are identified:

- Establishment of coffee pulperies on a co-operative society level.
- Fruit and vegetable handling, sorting and grading units, as a second phase with the appropriate processing facilities on a co-operative union level.
- Additional maize mills and oil mills, primarily small and medium sized operations; the oil milling sector needs to be further analyzed in order to avoid making the wrong investments.
- Establishment of small dairy plants with a capacity of about 5000 l/day to cater for the supply of hygienic consumer milk in urban areas.
- An integrated livestock slaughtering, processing and marketing project, preferably on a national scale, aiming at better utilization of the livestock resources with reduced losses and a vehicle for the co-operative movement to enter the export market for meat products; the initial phase of the project should be a Master Plan Study.

After the reinstatement of the co-operative unions in late 1984 and early 1985, co-operative agro-industrial development has been recognized as an important element in strengthening the co-operative movement and the supply of food to the population as a whole.

Hitherto, the co-operative unions have one maize mill and three rice mills. One maize mill is in the process of being taken over from the National Milling Corporation. The co-operative unions also own and operate eight oil mills, one of them jointly with the private sector.

A fairly large number of small village hammermills, probably some hundred, are run by co-operative societies to cater for local needs.

The technical conditions in the plants that have been visited, thus both co-operative and Government owned, are generally very poor. The major reasons are neglected maintenance in the past, scarcity of spare parts and frequently inadequate basic training of maintenance personnel. Many mechanics lack an understanding, for instance, of the consequences of damage to a bearing due to the use of over much force at removal and/or insertion of the bearing.

The economic situation, with difficulty in obtaining foreign exchange for spare parts, makes the situation extremely precarious.

Inadequate capacity utilization sometimes depends on insufficient availability of raw materials, either due to shortage or due to the commodity being channeled elsewhere. Regardless of the reason, the economic situation is not the best. It is likely that strengthening of the overall management would improve the situation.

Funds for rehabilitation of existing plants are basically not available.

In two regions, Kilimanjaro and Morogoro, there is keen interest in the establishment of mini-dairies with a capacity of probably 5000 to 7000 l/day. Other ventures have been mentioned and are listed under Section 6.

All plants would be small to medium-sized. Needless to say, in each and every case the project requirements would have to be studied in detail as a basis for evaluation and later decision.

Financing for investment in future co-operative food processing ventures is generally not available. The economic strength of the co-operatives, and their current engagement in commodity trade and agro-industries, does not suggest that sufficient capital can be generated within the movement and financing will thus have to be sought elsewhere.

1.0 INTRODUCTION

1.0.1 This survey for an assessment of the food-processing co-operatives in Tanzania was carried out 20 - 29 January 1986.

In order to be able to assess also the future potential for the establishment of new food-processing plants, an effort has been made to map, in general terms, the present food industry as a whole, and to some extent its problems and shortcomings.

1.0.2 Although animal feed processing does not belong to the food-processing industry, it has been deemed of some importance to include even this sector in the considerations presented in this report.

1.0.3 The reasons are primarily that the animal feed processing industry tends to be a focal point in an integrated approach to agro-industrial development; by-products from certain food industries are used in the manufacture of formula feeds; and the formula feeds are used for production of, e g, meat, milk and eggs.

1.0.4 It was recognized at an early stage that food industries pertaining to fish handling and processing will play an important role in the future in providing highly nutritious foods to the coastal and lake areas in particular. However, the lack of large steel-hulled fishing vessels for deep sea fishing precludes the exploitation of the outer waters, and the quantities of fish landed are reportedly rather small and erratic. The fishing dilemma may with advantage be taken up with an integrated approach on some other occasion, when the requirements as regards lake fishing may also be investigated.

1.0.5 Meetings and discussions have been held with representatives from the Co-operative Union of Tanzania (CUT), various Government authorities and organizations, the Marketing Development Bureau and a number of regional co-operative unions.

1.0.6 The program for the visit was arranged by CUT. Owing to the limited time available, the field visits proper were restricted to three areas, namely those of Kilimanjaro Native Co-operative Union (KNCU), Arusha Regional Co-operative Union (APCU) and Morogoro Regional Co-operative Union (MPCU).

1.0.7 In view of the circumstances, visits to these three unions were considered the best alternative in order to obtain information and impressions useful to an overall assessment of the co-operative food industry and its potential.

1.0.8 With the assistance of CUT staff members, information on the present situation regarding co-operative food industries in the other co-operative unions, except Zanzibar, was collected, although very much on a reconnaissance level.

1.0.9 Finally, an effort has been made to give an account of the overall framework within which a co-operative food industry may emerge and develop.

## 2.0 AGRO-INDUSTRIES IN TANZANIA

2.0.1 The Government, the co-operatives and the private sector are all engaged in various agro-industries.

### 2.1 The Government Sector

2.1.1 The Government dominates the scene through numerous marketing boards and parastatal organizations such as the Coffee Marketing Board, the Cotton Marketing Board, the Cashew Nut Authority, the National Milling Corporation (NMC), Tanganyika Meat Packers, etc.

2.1.2 Some of the parastatal corporations have subsidiaries engaged in various lines of processing. NMC, for instance, owns Tangold, which produces fruit preserves and juices, and the Coffee Marketing Board owns Tanganyika Coffee Curing Company Ltd, which processes the coffee beans delivered by the co-operatives.

### 2.2 The Private Sector

2.2.1 The private sector appears to be growing and has an interest in a variety of areas. Rajani Co, for instance, located in Dar es Salaam, operates the largest vegetable oil refinery with a capacity of about 60 000 tons per annum; Tanzania Food Corporation manufactures biscuits; Tanzania Baby Food Co produces Totolac, a mother's milk substitute. Others, such as Sunvita and Tanzania Food and Fruit Co, process fruit and vegetables into juices, preserves, baked beans and tomato ketchup, for example. Small fruit processing ventures are being established with the assistance of the Small Industries Development Organization.

### 2.3 The Co-operative Sector

2.3.1 Engagement by the co-operative sector in the food processing industry is limited at present, the reasons for which are discussed under Section 3.

2.3.2 The co-operative unions operate a fairly large number of cotton ginneries, reportedly some hundred, which are frequently combined with small vegetable oil crushing units. All machinery is more than 10 years old and the plants have been the responsibility of



and operated by district development corporations, regional development corporations or the Cotton Authority under the Ministry of Agriculture between 1976 and 1984.

- 2.3.3 Numerous small hammermills, with a capacity of 200 to 300 kg per day, were also returned to the co-operatives in 1985.
- 2.3.4 A closer survey of the present situation is given under Section 5, which presents impressions from the three co-operative unions visited, and Section 6, which gives a compilation of information from 22 co-operative unions and CUT.

### 3.0 THE CO-OPERATIVE MOVEMENT IN TANZANIA

#### 3.1 History in brief

- 3.1.1 The traditions of co-operation in Tanzania go back to 1933, when Kilimanjaro Native Co-operative Union was registered. The movement progressed steadily, admittedly with a parenthesis for the Second World War period, and by the mid-1970s had a well-developed system for collection, handling and storage of farm produce. The co-operative unions also operated a large number of processing units, in particular cotton ginneries, vegetable oil crushing plants, hammermills and central coffee pulping facilities, installations to separate the coffee beans from the berries.
- 3.1.2 When the co-operative unions were dissolved in 1975 the collection system broke down. Farmers had difficulty in selling their products, which discouraged the growing of certain cash crops.
- 3.1.3 A decision to reinstate the co-operative unions was implemented during the first half of 1985. The processing plants, the assets and liabilities of which had been taken over by Government district, regional or other authorities, have now been returned to a very large extent. The majority are in operation, or in the process of being rehabilitated, but there are examples where future operation or rehabilitation is out of the question.
- 3.1.4 It should be pointed out, however, that the primary societies were never dissolved during the 1976-1984 period. They were maintained, although under conditions which precluded co-operative agro-industrial development.

#### 3.2 Present status of the Co-operative

- 3.2.1 The Co-operative Union of Tanzania is the apex organization for twenty-four different co-operative unions, all of which are divided into two or several districts.
- 3.2.2 Each co-operative union has a number of co-operative societies as members. Rural societies are by far the largest in number, probably some 80% or more on an average of the total. Consumer co-operatives, industrial co-operatives and transport co-operatives are examples of other types of societies in the unions.

- 3.2.3 Only rural co-operative societies are concerned with agro-industrial development.
- 3.2.4 Transport and distribution is an important element in any large organization dealing with commodities and products. CUT owns National Distributors Ltd (NDL) jointly with NMC.
- 3.2.5 NDL is currently operating only in the Dar es Salaam region, but the intention is to expand gradually to other regions and eventually cover the whole of Tanzania.
- 3.2.6 A number of distribution centers are established and distribution has so far been limited to food items such as grain, flour, rice, sugar, beans, cassava and animal feeds. The present transport resources of NDL are limited, but sufficient to collect various products from the Union and NMC with subsidiaries and transport the goods to the district distribution centers where it is re-loaded for further transport by others, wholesalers and/or retailers. Transport of animal feeds is carried out by hired trucks.
- 3.2.7 Plans are in progress to provide farm inputs, fertilizer, etc., and farm machinery on a wholesale basis.
- 3.2.8 Evidence of the strengthening of the co-operative movement is that CUT has obtained a licence to act as an exporter and importer. This means that cotton, coffee, tea, tobacco and sisal remain in the hands of the various Government marketing boards, leaving scope for CUT to export directly in the future, without Government involvement, a wide range of products, including processed items. It also means that 50% of the sales in foreign currency may be used by CUT for payment of imports such as inputs, machinery, etc.

#### 4.0 ESTABLISHMENT OF AGRO-INDUSTRIES, REGULATIONS, ASSISTANCE

##### 4.1 Licences

- 4.1.1 The establishment of an industry — and food processing and other agro-industries are no exceptions — is subject to licensing by the Government. This authority is exercised by the Ministry of Industry. Restrictions apply basically only in cases where the national or, more frequently, the local capacity for the particular product is already adequate.
- 4.1.2 Vegetable oil crushing plants as a whole are reportedly under-utilized at present, for example, and licences would not normally be given. However, there are still areas with production of oil-bearing seeds which have no crushing facilities. In these cases licences are very likely to be granted for small capacity vegetable oil crushing plants.
- 4.1.3 Apart from this, the necessary import licences would have to be obtained.

4.2 Assistance

- 4.2.1 More concrete assistance for the establishment of agro-industries may be obtained through the Small Industries Development Organization, SIDO, which provides services for studies, designs, etc, through their regional offices, established in all regions with a few exceptions. These offices are headed by a Regional Officer assisted by two professional staff members, one engineer/technician and one economist.
- 4.2.2 The particular competence and experience of SIDO technical staff for the planning and design of food industries is not known.
- 4.2.3 SIDO also runs a training school for food processing industry personnel, which should be useful in connection with future food industrial projects in Tanzania.

5.0 INFORMATION AND IMPRESSIONS FROM VISITS TO CO-OPERATIVE UNIONS

- 5.0.1 The programs for these visits have all included discussions with union staff members, visits to union agro-industrial installations, and whenever possible to food industries operated by other agencies, in order to obtain a general idea of the technical status of the plants and how they are managed from a technical point of view, focusing on difficulties experienced in the past.

5.1 Kilimanjaro Native Co-operative Union, KNCU

5.1.1 Agriculture

- 5.1.1.1 The Kilimanjaro region is above all a coffee producing area. Staple crops are by comparison insignificant. However, both fruit and vegetables are stated to be grown with good results.
- 5.1.1.2 Production figures are not available except for tomatoes, the total production of which was reportedly 72 000 tons, 70 000 tons and 75 000 tons for the years 1983, 1984 and 1985 respectively.
- 5.1.1.3 Bananas are generally grown with the coffee trees and the overall production must be sizable, with large quantities being spoiled every year since there is no market outlet. The bananas are of both cooking and ordinary kinds but the ratio is not known. Other fruits are also common but could not be quantified.
- 5.1.1.4 The Union runs four farms with a total area of about 2 900 hectares; 100 hectares are planted with coffee, 440 hectares are

used for grains, mainly maize, 120 hectares for pulses and 30 hectares for vegetables. The vegetable area may be doubled if a reliable market outlet is established. 300 milking cows are kept, mainly on two of the farms.

5.1.1.5 Most of the farmers all over the region keep a few dairy cows, and the total production is assessed by union representatives as being substantial but could not be quantified. An annual production per cow of some 3 000 liters was also mentioned. Milk from the Union farms is delivered to the Government-run dairy plant in Arusha about 100 km away, reportedly at a price of Tsh 8 per liter. Other milk producers sell the milk locally, charging Tsh 15 per liter.

#### 5.1.2 Agro-industries

5.1.2.1 The dominant agro-industry is the Tanganyika Coffee Curing Company owned by the Coffee Marketing Board and Tanzania Coffee Growers Association.

5.1.2.2 KNCU operates the Moshi Ginnery. The plant was first established in 1938, but ten new double roller gins were installed in 1975. The overall capacity is stated to be 15 - 18 bales (2 700 - 3 200 kg) per 8-hour shift with a total annual production of 600 - 800 bales (110 - 145 tons) of lint.

5.1.2.3 Plant capacity utilization is low, due to insufficient quantities of cotton, and the ginnery is stated to run at a loss.

5.1.2.4 Frequent breakdowns were reported by the manager, although no major difficulties were faced as regards spare parts.

5.1.2.5 A visit to the plant showed that the pneumatic conveyor system for wool from the warehouses to the ginnery was leaking badly and in need of substantial repairs. A few gins were temporarily out of order. It appears that a major cause of the frequent breakdowns is inadequate control and maintenance.

5.1.2.6 Further training of the mechanics is a prerequisite for better reliability and performance of the gins in particular, but also of the plant as a whole.

5.1.2.7 Although the second stage processing of the coffee, and onwards, is the responsibility of the parastatal organization, the initial processing, the pulping, is carried out at farm level.

#### 5.1.3 Plans for the future

The KNCU plans for processing industries include

- central coffee pulping units
- vegetable oil crushing plant
- fruit processing plant
- small dairy processing plant

#### 5.1.3.1 Central coffee pulping units

The central coffee pulping units would be aimed at upgrading the coffee sector as a whole by shifting the present on-the-farm pulping process to a small scale industry at a low level, e.g. society level. Providing the units are properly designed and operated, the advantages would include 1) improved quality through timely pulping of the coffee berries and hence improved quality, and 2) relieving the coffee farmers from a tedious and worrying job, which would permit them to devote more time to the crops, coffee and other cash crops, which is expected to improve the performance of the farms.

These arguments in favour of central coffee pulping units are valid for any coffee producing area in the country.

#### 5.1.3.2 Oil mill

The Moshi cotton ginnery produces about 250 tons of cotton seed at the present level of production. This would have to be increased in order to provide a sound basis for a small oil crushing plant.

If production of cotton is increased and/or if other oil-bearing seeds are produced in the region to provide a basis of at least 500 tons of seed per year, establishment of an oil mill would be realistic.

The mill would then produce some 400 kg of vegetable oil per day and some 1.5 tons of oil cakes to be sold locally to the milk producers.

#### 5.1.3.3 Fruit and vegetable processing plant

The establishment of a fruit and vegetable processing plant is considered to be a realistic proposition. The combination of various fruits and vegetables would ensure a long processing season. Initially the production would be for local consumption with possible surpluses for marketing in the larger cities.

It seems reasonable, however, that the long term target should be export.

#### 5.1.3.4 Dairy plant

5.1.3.4.1 The extent of smallholder dairy production in the region, including the Union farms, would justify the establishment of a small dairy plant in Moshi for the supply of wholesome consumer milk and a limited number of products, initially probably only butter and cultured milk, if this is in demand. The capacity of the plant would probably be of the order of 8 000 liters per day, one third to half of which would be supplied by the Union farms.

5.1.3.4.2 Assuming a transport cost of Tsh 3 per ton kilometer, the annual savings in transporting milk to Arusha would be of the order of Tsh 300 000.

5.1.3.4.3 There are a number of contagious bovine diseases in the area, e.g. tuberculosis and brucellosis, both of which can be transmitted to humans. Although milk is traditionally boiled before use, a dairy plant in the region would improve the standard of food hygiene by always pasteurizing the milk before further processing or consumption.

5.1.3.4.4 A dairy plant in combination with a well organized and executed milk collection and pricing system would provide a future platform for dairy development in the region and give incentives to the small dairy farmers to improve production.

## 5.2 Arusha Region Co-operative Union

### 5.2.1 Agriculture

5.2.1.1 The Union has a membership of 64 rural societies. The farming is frequently diversified, which is shown by the figures below. These relate to purchases made by the Union between 1 July 1985 and 31 January 1986.

	tons
Cotton AR grade	318.0
Cotton BP grade	0.3
Coffee	6 525.5
Maize	38 880.0
Sorghum	1 058.3
Finger millet	1 859.2
Beans	1 081.4
Pease	94.3
Pigeon pease	1 934.5
Vetch	5 369.8
Yellow gram	259.4
Sunflower	208.1
Sesame	0.5
Black njaki	36.5
Castor seed	18.2
Pyrethrum	9.4

5.2.1.2 The number of dairy cows in the region is estimated at 26 000 head, mostly of local breeds upgraded with Jersey or Friesians. The number of replacements is not known but is likely to be about the same or more. The milk is collected to the Arusha Dairy Plant operated by the Government.

Figs and poultry are also kept on a commercial basis, but there is presently no information available as to what extent.

### 5.2.2 Agro-industries

5.2.2.1 Apart from the above-mentioned dairy plant there are several both Governmental and private enterprises involved in food processing industries in Arusha. Examples are NMC flour mills, Tanzania Food Corporation manufacturing biscuits and Tanzania Baby Food Company.

- 5.2.2.2 ARCU is currently negotiating with NMC regarding the return to the Union of one small maize mill and one feed processing unit. Both these were visited and comments are given in Appendix 1:1.

The maize mill may later be leased to NMC, operate on a contract basis for NMC, or operate as a completely independent mill and market the flour under a Union trademark.

- 5.2.2.3 The co-operative runs small hammermills in a few villages for local use only.

- 5.2.2.4 No central coffee pulping units were established in the region until 1961, and these have now been returned to ARCU. There are eight altogether, including one at a Union farm, but only five are in operation. The experience of these installations is favourable and a program is reportedly launched in neighbouring Kenya for introduction of this system of pulping coffee on a wide basis.

- 5.2.3 Plans for the future

- 5.2.3.1 Summary

The Union has paid attention to the need for vegetable oil in the area and the demand for animal feed, which is currently marketed in small quantities only and is of inferior quality and formula.

Problems related to coffee pulping are also acute.

The future plans thus include:

- take-over of the NMC maize mill (see Appendix 1:1, 1)
- establishment of small oil mill(s), max. capacity 2 tons/day, in various locations
- take-over of the NMC feed processing unit (see Appendix 1:1, 2)
- rehabilitation of central coffee pulping units and establishment of new ones.

- 5.2.3.2 The maize mill

It is believed that the conclusion of an agreement with NMC regarding the taking over of the maize mill is only a matter of time.

The condition of the mill should, however, be of great concern to the Union. The technical condition is very poor and the cost of rehabilitation considerable.

### 5.2.3.3 Oil mills and feed industry

The small oil mills are intended to cater for the local demand for cooking oil in different districts. The oil cakes would be transported to the feed plant in Arusha and used in the formula feeds.

It is suggested, however, that an integrated approach be considered when planning the vegetable oil crushing units and the establishment of a Union animal feed industry.

The main concept would be as follows:

- one central feed mixing unit in Arusha designed to produce feed premixes and formula feeds for supply to livestock and/or poultry farmers in that area
- oil crushing units located with regard both to local demand for vegetable oil (population density) and demand for feeds (dairy stock, pig and/or poultry density)
- establishment of feed preparation units adjacent, or close to the oil mill to facilitate easy transfer of the residue, the oil cakes, from the oil mill. The feed preparation unit should be simple in design and permit
  - buffer storage of oil cakes
  - storage of the main feed ingredient - various grains or e.g. dried cassava
  - hammer milling of feed ingredients which are to be conveyed to a batch mixer with bagging-out arrangements
  - weighing of the ingredients to be included in the feed mixes, and the ready feed.

Premixes designed for the different classes of livestock would be supplied from the Arusha premix plant. Each local feed preparation unit would be provided with formulas stating type and quantity of premix, oil cake and grains to be included in each batch. Instructions and adequate training would have to be given to the operators regarding the various procedures, e.g. mixing times (pre-setting), daily checking and maintenance and changing of spare parts.

The merits of this system may be summarized as follows:

- reduced transport costs for raw materials and finished products
- local involvement in rural small-scale industry
- modern feed technology with regard to animal nutrition is filtered to district or society level
- the decentralized system of feed preparation, governed from a central unit which has a competent feed nutritionist, is flexible and may be extended to new areas as demand arises; total lifetime investment in relation to overall processing capacity will be low.



5.2.3.4 Central coffee pulping units

It is evident from a visit to one of the old installations that not all of these are fit for rehabilitation.

The new units should be designed as standard units, initially with the traditional method of drying the coffee on beds.

However, the design of the handling principles should consider, and be prepared for, a system of semi-automatic drying of the coffee beans, preferably using solar energy. This would mean a gradual adoption of more advanced technology, which is essential in the long run to keep the costs at a competitive level.

5.3 Morogoro Region Co-operative Union, MRCU

5.3.1 Agriculture

5.3.1.1 The Union is organized in four districts with a total of 67 societies, the majority of which are Rural Co-operative Societies. Seven Service & Credit Co-operative Societies are also included.

The production of cash crops on the farms is stated as follows:

	Marketed quantities, tons/year
Cotton AR grade	6 000
Cotton BR grade	700
Kapok	1 000
Coffee	300
Paddy	1 177
Maize	400
Millet	18
Red beans	135
Pigeon pease	50
Sunflower	1 000
Soyabeans	65
Groundnuts	10
Castor seed	150
Cacao	20
Cardamom	20

5.3.1.2 Fruits, including pineapple, mangoes, oranges and bananas, are grown in abundance. At present they are produced only for home consumption with very small quantities marketed. A large portion of the crops is spoil due to lack of market outlets, and it is believed that available production volume is sufficient for a medium-sized processing plant.

Vegetables such as tomatoes, onions and carrots are grown in fairly large quantities.

- 5.3.1.3 There is a potential for increase both in crop yields and in area cultivated. MRCU is encouraging the farmers to increase production by providing extension services, farm inputs and the services of farm machinery.
- 5.3.1.4 Two farms are operated by the Union, one of approximately 1 800 hectares and one of 1 400 hectares. These are used as demonstration units and are thus of vital importance to the extension work.
- 5.3.2 Agro-industries
- 5.3.2.1 MRCU has six cotton ginneries, one kapok ginnery and one vegetable oil mill in the Kilosa District. This is located adjacent to a ginnery. Another oil mill is presently under construction in the Makege District.
- 5.3.2.2 A vegetable oil crushing plant and oil refinery, MOPROCO, owned by the Government, is located in Morogoro. There is also a very small private oil mill in the town and one small private juice processing plant in the Union's region. It is located in the citrus area and is said to process oranges only.
- 5.3.2.3 A large tannery run by the Government completes the list of agro-industries in the MRCU area. Hides are collected from all over Tanzania and also from neighbouring countries. Locally the Tanzania Hides and Skins buys the hides and skins at a negotiated price. MRCU intends to request the take-over of the procurement of these products in an endeavour to ensure that the farmers obtain better prices for their skins.
- 5.3.2.4 The MOPROC vegetable oil processing plant was visited in order to obtain information regarding problems experienced in a venture of that size. Impressions from the visit are given in Appendix 1:2, 1.
- 5.3.2.5 The Kilosa Ginnery and Oil Mill were also visited. Comments are given in Appendix 1:2, 2 and 3 respectively.
- 5.3.2.6 In summary, the Co-operative Union processing plants are not in the best state of repair and will have to be subject to rehabilitation to ensure future successful and viable operation. An important element in the rehabilitation process is to acquire the necessary spare parts, which must then be considered at least in a two year perspective with replenishment in good time before every new season.
- 5.3.2.7 Complementary training of management, operational and maintenance personnel is essential - many of the problems and breakdowns that have occurred in the past may thus be eliminated.

5.3.3 Plans for the future

The Union's plans for new food industries include

- additional small oil crushing plants
- initially one fruit and vegetable processing plant, starting with fruit, vegetables to be included later.

There is also some interest in coffee pulping plants at the society level in the coffee area and small dairy plants for consumer milk, particularly in the more densely populated areas.

6.0 FOOD PROCESSING INDUSTRIES BY REGION

6.1 The information below was collected by CUT. The time available for the task was too short for the list to be made comprehensive and correct on all points. Efforts have been made to differentiate, as much as possible, between already existing projects and those in the planning stage, or projects for future consideration.

6.2 Although presumably incomplete and partly incorrect, the list nevertheless serves the purpose of indicating the current situation.

The small village hammermills operated by the co-operatives are not included here.

<u>Regional Union</u>	<u>P r o j e c t s</u>	
	<u>Existing</u>	<u>Future</u>
1. Arusha	Coffee pulperies (Maize mill <sup>v</sup> ) (Feed proc.unit <sup>v</sup> )	Coffee pulperies Oil mills Feed prep.unit(s)
2. Central/Dodoma	?	?
3. Iringa/Mufindi	None	-
4. Kagera	Oil mills (cotton seed)	Coffee pulperies
5. Buha	Oil mill (palm oil)	Fish proc.ind.
6. Kilimanjaro	Cotton ginnery	Coffee pulperies (Oil mill) Fruit & veg.proc. ind. Dairy plant
7. Lindi	-	Oil mill(s) (simsim)

<sup>v</sup> under negotiation

<u>Regional Union</u>	<u>P r o j e c t s</u>	
	<u>Existing</u>	<u>Future</u>
8. Mara	Oil mill (cotton rehabilitation)	Maize mill
9. Mbeya	Oil mill (cotton)	Maize mill
10. Morogoro	Cotton ginneries(2) Oil mill (rehab)	Oil mill(s) Fruit & veg.proc. ind. Coffee pulperies Dairy plant(s)
11. Mtwara	-	Oil mills Cassava proc.plant
12. Mwanga	Ginneries Veg.oil refinery	Rice mill Fish proc. plant
13. Ruvuma	Oil mill (simsim)	Maize mill
14. Rukwa	-	Maize mill
15. Shinyanga	Cotton ginneries(3) Oil mills (cotton seed)	Maize mill
16. Singida	Cotton ginneries	Oil mill (sunflower, simsim) Maize mill Ground nut proc. plant
17. Tabora	Cotton ginnery Oil mill (cotton seed) Maize & rice mill (rehab)	-
18. Tanga	Cotton ginnery	Oil mill Fruit & veg.proc. plant
19. Kyera/Rungwe	Rice mill	Maize mill Fruit proc.ind. Oil mill
20. Vuasu	Rice mill	?
21. Coast	?	Fruit proc.ind.
22. Njoluma	?	Maize mill
23. CUT	-	Maize mill, DSM Rice mill, Zanzibar

7.0 COMMENTS AND CONSIDERATIONS

7.0.1 The comments presented in the previous sections regarding the plans for and design of central coffee pulping units, oil mill/animal feed projects and small dairy plants are relevant regardless of where they would be located.

7.0.2 In the following, some guide lines are given for fruit/vegetable projects followed by some considerations pertinent to different sectors of interest to the co-operative movement.

7.1 Fruit and vegetable processing industries

7.1.1 A general comment to fruit and vegetable projects may be useful, since there is a documented interest for this kind of venture.

7.1.2 It is also apparent that many regions have a great potential for development of viable fruit and vegetable industries, providing reliable market outlets can be secured.

7.1.3 The market price for high quality fresh fruit and vegetables is always far better than can be paid by the processing industry. An important policy for a food processing industry is always to use good standard raw materials to ensure top quality products. This is one prerequisite for successful marketing of the product. The quality must also be even and reliable.

7.1.4 For these reasons a fruit and/or vegetable processing project should always include a reception, sorting and grading department, provided with adequate intermediate storage facilities for the sorted and graded products. Suitable arrangements should be included for packing the high quality fruit and vegetables for marketing locally, or for more distant domestic markets.

7.1.5 In fact a fruit/vegetable sorting and grading plant may be the first step in the plans for a future processing industry, providing there are reasonably good prospects for a sizable local market.

7.1.6 Collection routines can be established over a number of seasons. Experience will be gained regarding actual availability of raw materials and standards. Competent management will be trained, etc.

7.1.7 A pricing system will also have to be adopted which provides sufficient incentive to the farmers to supply quality products. This implies, inter alia, that the grading of each delivery forms the basis for payment to each individual producer where deductions are made for inferior quality and bonuses for choice quality according to a sliding scale. Very poor products would have to be rejected.

- 7.1.8 The next step would be the processing industry, which would have to base the product list on local, domestic, and in the longer perspective international market requirements.
- 7.1.9 Needless to say, each and every project should be based on a qualified feasibility study, where the specific local conditions regarding raw materials supply are identified and assessed, the local market demand studied and the technical outlines determined for later cost calculations and analyses.
- 7.1.10 Other elements essential for the feasibility study, such as research pertaining to the domestic market as a whole, including co-ordination on a national level, to avoid flooding of the market for one specific item, and international market surveys and analyses, could with advantage be the responsibility of CUT.
- 7.1.11 It may be worth considering that high quality fresh fruit most likely has a market internationally during certain periods of the year. This, however, calls for well organized and implemented collection, grading, transport and shipping under conditions which can ensure that the quality is retained until the fruit reaches the importer.

## 7.2 Maize mills

- 7.2.1 300 small ~~hammer~~mills are to be included within the framework of the World Bank financed Grain Storage and Milling Project presently under consideration. They are intended for village level use and may, as one alternative, be sold to the co-operative unions. Thus, the NMC is prepared to consider supplying mealie-meal or milling services to the population at large, jointly with the co-operative unions.

## 7.3 Oil mills

- 7.3.1 The total oil crushing capacity in the country is stated to be in excess of the requirements.
- 7.3.2 This is probably correct, if based on the nominal or installed capacities. On the other hand, if the oil mills visited during this survey reasonably well represent an average for the country, the true picture may be different. Rehabilitation of some of the oil mills may be necessary. This is a point of some interest in determining the future demand for small village or district oil mills, especially if the efforts to increase the production of oil-bearing seed are successful.
- 7.3.3 An inventory carried out by CUT would be useful.

7.4 Dairy plants

- 7.4.1 The dairy processing industry is at present in the hands of the Government through the Tanzania Dairy Industries. They have a total of six milk processing plants, in Dar es Salaam, Arusha, Tanga, Mousoma, Tabora and Mbeya. All plants are reportedly equipped for reception of locally produced milk and also for recombination of imported milk powder and fat.
- 7.4.2 Milk producers in locations other than the neighbourhood of the above-mentioned places will have to sell their milk locally to peddlers, or directly to individual consumers.
- 7.4.3 Milk is an important food item, essential to improve the nutritional level of the diet, in particular to infants. Milk production is, or may be, a valuable source of income for smallholders and medium-sized farms. Diversified farming with some animals tends to improve the fertility of the land by supplying farmyard manure. This is important for increased crop production when fertilizer is scarce and the price is high.
- 7.4.4 To sum up, a viable dairy industry is of national interest, and one basic element to achieve this is the organization and implementation of milk collection, processing and marketing. Other basic elements, such as provision of dairy stock, breeding, feeding, veterinary services, management, etc., lie outside the scope of this report but are equally important.
- 7.4.5 The structure of the emerging dairy industry in Tanzania and the social structure favours small dairy processing units which can supply the local requirement of pasteurized consumer milk in particular.
- 7.4.6 The development of a viable dairy industry along these lines is likely to be of interest to a large majority of the co-operative unions. A few examples of interest have been identified in the course of this survey.

7.5 Livestock trading, slaughtering and meat processing

- 7.5.1 The present system of meat supply, in particular to the more densely populated areas, includes licensed livestock traders, livestock auctions, and butchers who slaughter the animals in municipal slaughtering premises, or otherwise, and sell the meat in their own shop or shops.
- 7.5.2 Loss of weight and quality of the carcasses is unavoidable when the live animals are moved long distances on the hoof, by truck or by train, unless special arrangements are made for watering and feeding along the route.

- 7.5.3 It is reasonable to assume that the majority of the cattle from the hinterland, although in good condition when sold by the farmer/stock-keeper, is purchased by the butcher, or butchering company in the cities, in a poorer condition. This reality is likely to reflect on the price to the cattle breeder and also on the price the consumer has to pay.
- 7.5.4 The system will have difficulty in providing top quality carcasses and cuts, which is desirable for successful competition on the export market. As future export of beef is included among the alternatives to improve foreign currency earnings, suitable measures should be taken for modification of the system, the details of which will have to be worked out.
- 7.5.5 The co-operative unions, with CUT as a co-ordinating body, are the obvious executing agencies for a scheme of this caliber. A preliminary positive response has been registered at both levels and also from Government representatives.
- 7.5.6 At first sight this suggestion may seem remote in connection with a survey of food industries. The involvement of the co-operative movement, initially in livestock trading, would eventually include engagement in the slaughtering of the animals, meat cutting, processing and rendering of by-products and offal.
- 7.5.7 The time element from the first step to engagement in the slaughtering and meat processing depends on, among other things, level of ambition and available resources in terms of planners, managers and funds for investment.
- 7.5.8 The slaughtering sector is as yet unexploited but has a sizable potential.



## PLANTS VISITED IN ARCU AREA

### 1. Maize mill

The mill has not yet been handed over to ARCU. It is located in a godown belonging to the Union.

The processing line included originally cleaning of the maize, washing, presumably conditioning, roller mill (1st break), sifter, roller mill (2nd break), bagging.

The two roller mills, manufactured by Baumgarten Hamburg, are very old, probably 25 years or more.

The capacity is about 40 tons/24 hours.

The cleaning section, which used only one air/screen cleaning machine, is in a bad state of repair with seemingly poor performance.

The washing unit had not been in use for many years. It is disconnected from the line, partly disassembled and presumably not worth the cost of rehabilitation.

Both roller mills are inadequately maintained. A thorough technical inspection may conclude that rehabilitation is too costly. Several spouts in the conveying system leak, with the result that small heaps of flour were scattered in places, e.g. on the mill floor.

The mill is generally untidy, badly cleaned and contaminated by rodents and insects.

It is concluded that the mill at present is not in a state to produce flour of an acceptable hygienic standard.

A nearby part of the building used to be a rice milling section. Two McKinnon & Co Ltd rice mills were still there, apart from the debris of various dismantled machines. One of the rice mills was partly disassembled, the other was said to function, a statement which was contradicted by the mechanical state of the mill, with loose end-cover plates, for instance. The scrap value of the rice section is zero.

The workshop facilities appeared to be rudimentary, with only an inferior and inadequate set of tools.

### 2. Feed processing plant

This is still operated by NMC, although housed in a spacious ARCU warehouse with the approximate dimensions of 20 m x 40 m and about 6 m at eaves.

The plant has two lines, each with an intake hopper - elevator to a pre-bin - hammermill (Briton Grinder, size B 7/2), the capacity of which may have been 300-500 kg/hour - cyclone/ bagging off - intake hopper for feed ingredients - elevator - batch mixer (about 2 m<sup>3</sup>) - bagging off.

One of the lines was in operation but no information was available regarding the performance.

The other line was partly dismantled and the pneumatic transport tubing from the hammermill collapsed.

It is believed that both lines can be rehabilitated at a reasonable cost.

The equipment is not of such a standard that it can be used for mixing of pre-mixes (see 5.2.3.3 Oil mills and feed industry). The plant could with advantage be disassembled in connection with future rehabilitation and transferred, one line to each of two locations, and serve as local feed preparation units.

PLANTS VISITED IN MRCU AREA

1. MOPROCO Vegetable Oil Mill and Refinery

This Government owned enterprise was established in 1970. The plant has a complete seed preparation section, an oil crushing section, a solvent extraction section presently under construction and which was not visited, a refinery and a packing section.

The rated capacity of the crushing section is stated to be 100 tons of seed/24 hours and that of the refinery is 100 tons. The other sections are dimensioned accordingly.

The plant is stated to operate 6 days a week or about 330 days a year and the actual capacity of the plant is 30% of rated capacity, or approximately 50 tons of seed/24 hrs. The low capacity is primarily caused by shortcomings in the crushing section.

It was further stated that the plant was never commissioned, since contractual capacities were never attained.

Impressions from the visit to the plant are summarized as follows:

- Seed preparation section appears to be unduly complicated in view of required capacity; the main part of the machinery is in a poor state of repair and some not operable; unacceptable covers of baked dirt, clogged screens and general untidy.
- Oil crushing section with continuous roller mills reported to never performed according to specifications; out of 12 roller presses manufactured on licence in India (two presses in England), three had been thrown out, one was partly operable and one was operable but, according to the operating engineer, not without one serious breakdown in a 10-hour shift; one screw press of US manufacture was operating satisfactorily with no major problems; wire screen out of order; overall conditions leave much to be desired.
- Refinery. Neutralization section incomplete due to absence of important equipment such as separators. The performance of the bleaching process not acceptable, most likely due to the use of out-dated bleaching earth which has been in use since the mid-1970s. Pressfilter required thorough cleaning and changing of filter cloth. The separator appeared to function, judging from an oil sample. Final product left for comments. Tanks, tubing, valves, etc. unattended and covered with layers of residue, hence the hygienic conditions not acceptable.
- Packing section. Two lines completely broken down; scales reportedly unreliable and obsolete.

The final problem was strong odour of the oil, which is a very low grade product.

There was evidence that the mechanics were not adequately trained. Tools appeared to be in short supply. Spare parts a major problem.

The plant capacity is likely to be 15 to 20% of rated capacity rather than 30% and the final product, the cooking oil, is very much below ordinary standard.

## 2. Silosa Ginnery

The ginnery was established in the late 1940s.

The ginnery is provided with warehouses for unprocessed cotton, which is transported to the ginnery building by means of a pneumatic conveying system.

There are 15 double-roller gins, 10 of British and 5 of Indian manufacture. The processed cotton wool is collected in jute sheeting and carried to the baler area.

At least 200 bales of AR cotton and expected 300 bales of BR cotton would be the result of the current season.

There was an unreasonably high breakdown of the gear-wheels in the Indian gins during the past season, over 100 in total. All these gins are now dismantled. During the same period 10 spare gear-wheels had been used for twice the number of British gins. So far, five gear-wheels have broken this season.

Impressions from an inspection of the installations are summarized as follows:

- Pneumatic conveying system from warehouses to ginnery out of order as a result of bearing breakdown in the fan. All cotton had to be sacked and carried to the ginnery.
- Out of the 15 remaining gins, two are out of operation; no roller bearings for main shaft.
- The knives in some gins inadequately sharpened or damaged, resulting in excess lint left on the cotton seed; lack of spare knives.
- Five gins had to be hand-fed since the mechanical feeders lacked V-belts.
- Numerous other V-belts on the gins worn out, resulting in poor pulling and reduced performance.
- Bearing covers missing in places, with the consequence that the ball-bearings are contaminated by dust and not properly greased - eventual breakdown.
- Several scraper rollers out of alignment, bent fixtures, damaged rollers, etc.

The Manager stated that the main difficulties were related to lack of spare parts, bearings, both fixed and moving knives, V-belts and gear-wheels in particular. The dismantling of the Indian gins has lessened the gear-wheel problem.

There were obvious examples of damage to the machines due to improper mechanical skills exercised in maintenance and repair. Proper training of operation and maintenance personnel in basic mechanics and specific mechanics for ginnery equipment is likely to improve the situation dramatically.

For economic operation of the ginnery in the future, the plant must be subject to major rehabilitation efforts, including the replacement of five gins and dismantling and renovation of ten gins. The conveying lines, both pneumatic and mechanical, need to be overhauled.

To ensure future acceptable maintenance, the workshop facilities need to be improved considerably. This will also have to include the acquisition of an adequate supply of a variety of spares.

The complementary training of all operation and maintenance personnel is essential -- repetition of many of the past difficulties would thus be prevented.

### 3. Kilosa Oil Mill

The plant has not been in operation since 1983.

The processing line comprises seed preparation equipment with decortication of the cotton seed in a crusher, followed by a drum separator, a cooker with steam boiler using solid fuel, and finally 8 expeller type presses with a combined capacity of about 800 liters of cooking oil per 8-hour shift.

Several essential parts were missing, such as the electric motor to the husk aspiration fan after the husk separator, starters and safety devices in the electrical system, V-belts in many positions, etc.

The intention is to recondition the plant and spare parts have been ordered.

Test runs have been carried out with one expeller with a satisfactory result. Expected capacity was reached and the resulting cooking oil was of good quality, clear and light in color, no odor and normal taste. The amount of residue fat in the oil cakes was not known and a sample was taken by a Union representative for analysis in Morogoro.

Although the basic equipment is all likely to be in an operable condition after reconditioning and addition of missing items, care should be taken to thoroughly check and repair defects on all conveying elements in the plant. Cleaning is essential and painting of steel works with anti-corrosive paint to facilitate keeping all installations in a tidy condition, which is a prerequisite for acceptable plant hygiene.

The buildings also need to be repaired and cleaned on the inside.