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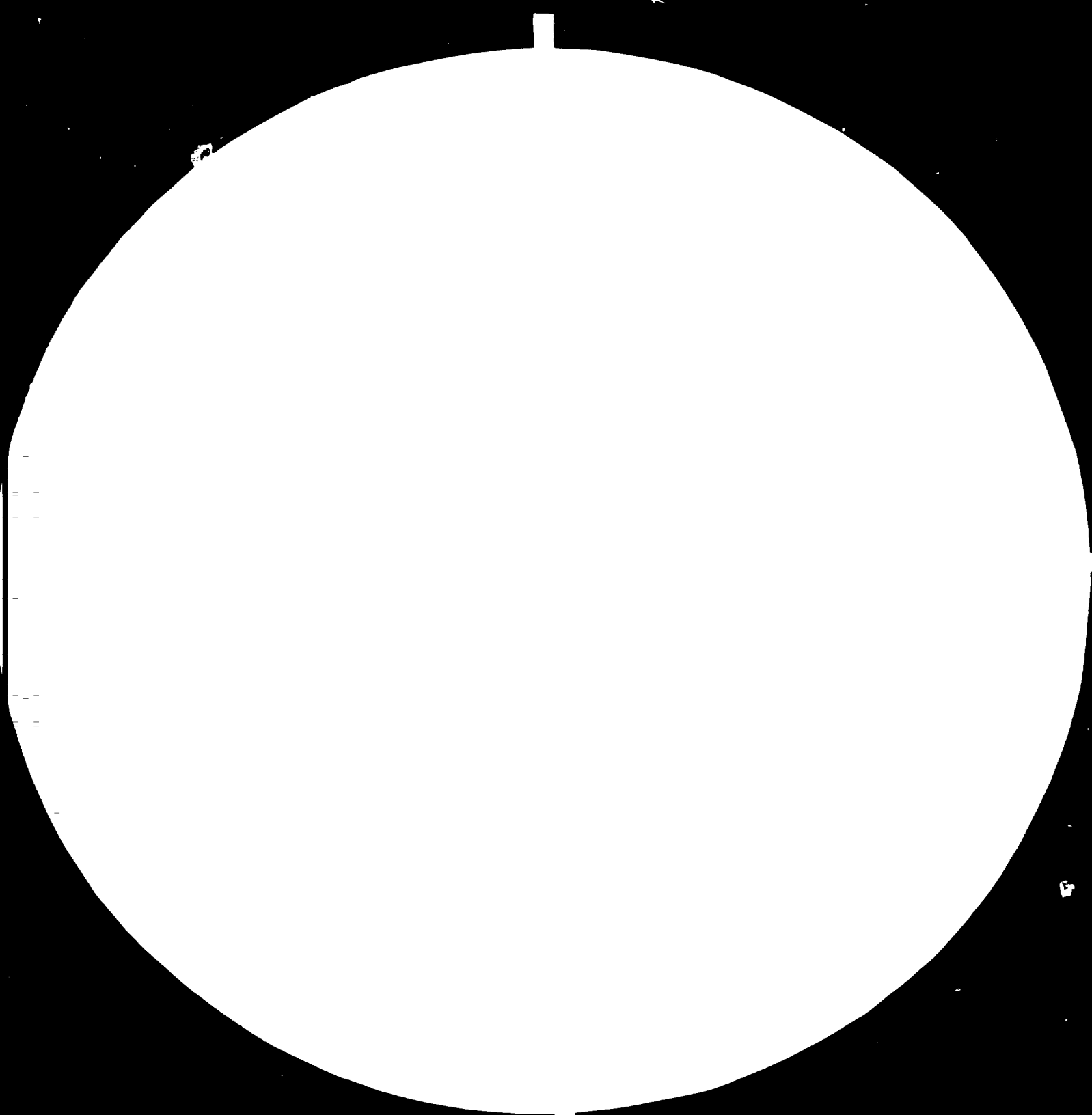
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CONSULTATION ON THE AGRICULTURAL
MACHINERY INDUSTRY,

REPORT OF INVESTIGATIONS IN EAST AFRICA
ON ISSUES SPELLED OUT IN THE DISCUSSION DOCUMENT

Countries visited and dates :

- ETHIOPIA from 19/3 to 25/3/79
- KENYA from 26/3 to 6/4/79
- TANZANIA from 12/4 to 26/4/79

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INTRODUCTION

The purpose of the mission was to assess the reactions of the principal countries in a region regarding the issues spelled out in the Discussion Document dated 6 November 1978.

The region visited was East Africa and countries were Ethiopia, Kenya and Tanzania, some constraints in travel means and custom formalities obliged the expert to reduce the travel to these only three countries instead of for.

Some common facts can be brought out from the visit in the three countries :

- Agriculture is the main activity in each country about 90 % (85 % in Kenya) of the economically active population is engaged in agriculture.

- The Agricultural Mechanization is at the first stage, essentially using hand tools. And when ox-drawn implements are used it is only ploughs (swing ploughs in Ethiopia) and very few ox-carts.

Sophisticated powered machinery are confined to large farms which have their own network in training, repair and maintenance.

- Basic facilities for Agricultural Machinery Industry can be found (forging, welding and drilling facilities) but do not work at their full capacity (except in Kenya). In the three countries mainly hand tools are produced and there is a real need in design of more appropriate implements.

- Generally no real policy was undertaken until now, even if there is a will to develop agricultural mechanization and agricultural machinery industry.

It is only in Kenya that we found in the new development plan (1979-1983) some references to those subjects. In the both other countries the policy was just at the level of a draft document. In the three countries there is a great need in definition of a general strategy in agricultural mechanization in relation with the development of agricultural machinery industry.

- There are some research institutions but all are new and just starting their work.

Until now testing was their main activity and projects of design, development, and research Centres in farming systems started few years ago.

- In each country there is a lack of trained manpower in Agricultural Engineering at the level of engineers and mainly of technicians.

.../...

REACTIONS TO THE ISSUES

We shall follow the classification made in the Discussion Document.

Issue A:

In Ethiopia :

The requirements of hands tools are at present produced partly by craftsmen and partly by a factory (with old facilities).

This issue was found as very relevant for the country, and the first priority in this subject is to reinforced the present factory, and finance it.

The country is also fostering the development of small scale industries but very few is available in agricultural machinery industry. The main constraints are financing and the lack of designs already tested and available in the country.

In Kenya :

The situation is different, Kenya is self reliant in this industry. Some more complex items are made in the categories I and II. And Kenya is exporting a part of its production. The country wants to develop this industry in rural areas by small scale industries. Here there is a lack of trained manpower in management and also a lack of proper designs.

In Tanzania :

Tanzania is in way to realize this recommendation.

Some facilities are already working and some others are planned in form of small scale industries or bigger factories. But the implements (except hand tools) already made do not seem to be quite appropriate to the local conditions. And there is also a lack of trained manpower and foreign currencies for the purchase of raw materials.

Thus the reaction to this issue was positive, but constraints in financing, proper designs and trained manpower were pointed out.

In conclusion :

The general reaction was positive, in all countries the basic facilities are there but could be more efficient. There is a general lack of finance, appropriate designs and trained manpower mainly in management.

.../...

Issue A_{ii}

In Ethiopia

The reaction to this issue was positive. Indeed in Ethiopia they are starting a crash programme for training technicians. There are many institutions for the lower levels, but the training programme is essentially needed at the middle and higher levels.

The training has to be done in priority within the country.

Assistance is needed to strengthen the existing institutions in the subject of Agricultural Engineering, with finances and technical assistance.

In Kenya

The reaction was positive as they are just starting the training of Agricultural Engineers. They project to strengthen this training, in relation with the training of technicians who are, as in the other countries the more needed. Technical assistance and financing of the facilities required would be welcome.

In Tanzania

If some institutions exist, they are not felt as very effective and the reaction to this issue was really positive.

There is a lack of Agricultural Engineers as well of Technicians.

Assistance is needed to strengthen the facilities existing and provide teachers.

Issue B

These issues were considered as the most important by all persons met in the three countries.

Issue B_i

In Ethiopia there is no policy, no plan and the country is just setting up the conditions necessary to draw up a plan.

In this condition a strategy is felt necessary and assistance is needed in collecting data in Agricultural Mechanization to formulate plans and strategy.

In Kenya

There is a development plan for the five next years were some objectives are defined and institutions involved.

.../...

But there is no real implemented strategy linking all the actions made in this field. The lack of such a strategy was felt by all the persons met and the issue was found relevant. It was felt that the main constraint for the establishment of a strategy was the lack of an institution which was responsible of its redaction and implementation.

In Tanzania

There is a development plan, but only broad targets are defined in Agricultural Mechanization.

No real policy or strategy is drawn in this subject. Industry and Agriculture are not linked in this field and some reactions were that industry was not producing the appropriate requirements of the Agriculture.

Thus the formulation of a strategy in agricultural mechanization and in agricultural machinery industry is the top priority in Tanzania.

Issue B.ii

In none of the countries Agricultural Machinery Committees were existing, and the Agricultural Machinery Design and Development Centres existing in the three countries were doing more testing activities than design and development.

Generally all the institutions involved felt that this issue was the more relevant for the conditions met in each country.

Only in Kenya there was an informal Committee which had to be strengthened in a legal Committee.

It was told that those Committees should be strong enough to define a general strategy and control its implementation, by coordinating all the institutions involved.

In conclusion the issues B were considered as the more appropriate to the local conditions and relevant for all categories of farm implements and for all stages of development in Agricultural Mechanization and Agricultural Machinery Industry. It was said that this issue should be the first one considered by the next consultation.

These two groups of issues A and B were considered as the more up to date in the countries visited. And for the next issues, if the reactions seemed positive, it was not felt that the country was in the way to realize them.

All the reactions were roughly the same in the three countries and we shall summarize them for each issue.

.../...

Issue C_i

Generally some contracts including these conditions are made, however many constraints exist in the control of their implementation.

Some assistance was sometimes required for the preparation of the contracts, and the main problem in this subject is the large range of models of contracts or tenders existing with each kind of assistance. Per example tenders for International Assistance are different for each organization involved.

Issue C_{ii}

If the small size of the market was felt as a main constraint for the development of manufactures of more complex agricultural machinery, however it seemed that a co-operation in regional production and marketing was not already applicable. And the implementation of this issue would meet many constraints mainly due to the lack of strong relationships between countries involved.

Issue D

In Each Country visited there were some tentatives to provide credits to small producers.

But the main constraints found every where are the lack of foreign currency for the purchase of facilities and raw materials.

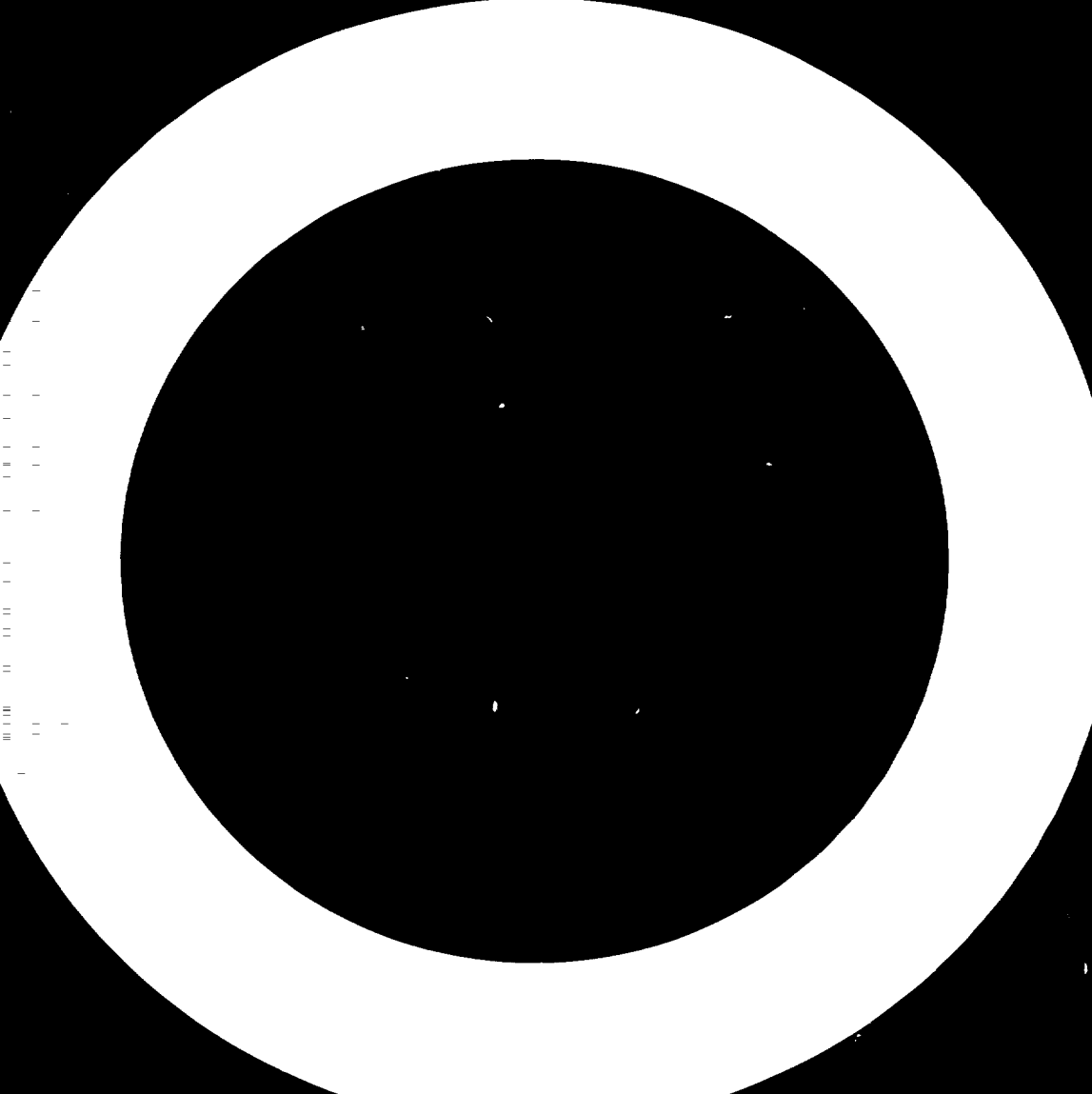
Assistance is required in finance and in the redaction of a credit policy for the mechanization of small farms and for the development of small Agricultural Machinery Industries.

ANNEXES I

SURVEY OF THE DIFFERENT ASPECTS
IN EACH COUNTRY

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b) Policy in Agriculture and Industry

The top priority is to provide enough food to the country.

To reach this objective some targets in Agriculture were defined at some levels :

- Level of state farms : their hectarage will be increased from 75.000 to 160.000 ha and their fleet in agricultural machinery will increase to follow the augmentation of the area under state farms (1.000 tractors were recently imported from East European Countries).

- Co-operatives level : their organization will be fostered and if necessary they will be helped in purchasing agricultural machinery.

- Farmers level : a settlement program is started to foster the exploitation of new lands.

The second priority is to increase the industry production toward the agricultural sector. In this aim the following industries will be fostered :

- Factory making hand tools
- Textiles factories providing a market for the cotton produced in the country
- Industry of food processing.

In this objective the Agricultural Machinery Industry has a high priority but there is only one factory making hand tools, and important constraints are faced in implementing this will.

The improvement of small farms mechanization is not a top priority of the economic campaign and only hand tools are foreseen to be used in a near futur.

In this objective, the government wants to encourage the hand tools factory which has to face problems of heavy debts and old facilities. In this purpose some assistance is required in financing, and in technical assistance (design and management).

At present the government plans to establish a foundry (10.000 tons/year) which will provide industry in some spare parts.

III - TECHNICAL ASPECTS

1°) Situation for each category

a) In category I

Local manufacture is confined only to hand tools.

.../...

The production of the Metal Tool Factory is the following :

Pick axes	60,000	pieces
Showels	35,000	"
Cro bars	7,000	"
Hoes	68,000	"
Hammers	10,000	"

This production represents roughly 30 % of the total demand in hand tools, 60 % are made by rural craftsmen and blacksmiths and 10 % are imported.

There is no production of ox ploughs, but there are 8 Millions of draught oxen, and the land preparation is made with traditional swing-ploughs made locally by farmers themselves or blacksmiths, raw materials are found in scraps.

There were some attempts to develop the usage of ox-ploughs with bilateral assistance in a project called A.R.D.U. (Agricultural Rural Development Unit) where some ox ploughs were designed and then produced (20.000 ploughs made by the Metal Tool Factory), also some ox-carts (400 kg) were designed and are still produced in the A.R.D.U. workshop, (100 ox-carts per year).

The foreign assistance for the A.R.D.U. project ended in 1974 and the ploughs are no more produced. The reasons can be both the inadaptation of the plough it self and the lack of a proper extension work in the field of Agricultural Mechanization.

In this category Ethiopia is at a very early stage of mechanization but very few has to be done to improve the situation. We saw that the basic conditions were already fulfilled :

- draught oxen
- training of farmers in usage of animals
- basic facilities for the production of implements.

But the country has to foster the research in design and testing, in the extension work and renovate its agricultural machinery industry.

This action has to be planned in a near futur.

b) Category II - Intermediate Machinery

Very few implements are used in this category, only some manual sprayers and pumps.

All implements in this category are imported. There is no plan for local manufacture.

.../...

c) Category III - Powered Machinery

The present fleet of tractors is about 2.500 tractors all imported and, since 1974, tractors come mainly from East European Countries.

All the powered machinery is concentrated in state farms which cultivate 2 % of the total cultivated area and are planned to cultivate 4 % before 1980.

All importations are under the supervision of the Agricultural Engineering Corporation.

At present there is no project for the settlement of an tractor assembly plant. In this field foreign assistance is required to make some preliminary studies. The main constraint for the establishment of a manufacture in this category are :

- A small market
- Lack of foreign currency for the purchase of raw materials
- The lack of trained technicians and Agricultural Engineers.

In a near futur there is a project for the establishment of a foundry of 10.000 t/year. This foundry could produce some spare parts for the industry.

d) Category IV - Specialized Machinery

The national fleet in combines is roughly between 75 and 100. They are used only in state farms and there is no plan in short or long term even for assembly.

IV - INSTITUTIONAL ASPECTS

1°) Government policy in the field of technology transfer

An institution called the Science and Technology Commission has recently been established and is not yet effective.

They need some technical assistance in the field of planning and linkage with other similar institutions.

2°) Design and Development

There are three institutions :

- Agricultural Research Institute : established for years ago with the help of F.A.O. There is a division of Agricultural Engineering with a small workshop. The division is just starting its work with an assistant from F.A.O. They are designing

.../...

some prototypes of simple water pumps and enset divisers. Their main constraint is the planning of their work in linkage with the other programmes in research. They also need to establish relationships with the agricultural machinery industries and with the extension institutions.

In this background the issues B(i) and B(ii) were felt as the more important and relevant for all the categories even the Categories I and II.

- Agricultural and Rural Development Unit (A.R.D.U.)

Established before the Revolution with a bilateral assistance which ended in 1974, this institution faces a problem of lack of finance, and technical assistance. Some prototypes were designed and built but no factory began to manufacture.

- Walaïta Agricultural Unit (W.A.D.U.)

This institution is even less effective than A.R.D.U., it was also established with the help of Foreign Assistance which ended at the Revolution.

- Agricultural Engineering Corporation : does some test on powered Machinery before their introduction. The first priorities in this field are the establishment of a general strategy and of relationships between the different institutions involved in this subject.

These institutions have to be reinforced and multiplied to meet the various conditions found in the country.

3°) Repair and Maintenance

This field is covered only by the Agricultural Engineering Corporation in state farms for powered machinery.

The Agricultural Engineering Corporation (A.E.C.) is in charge of Agricultural Machinery imports and follow up services for state farms. In this purpose the A.E.C. holds a central workshop in Addis and a central store for spare parts. There are also for mobile repair groups based in Addis.

The A.E.C. is planning to establish some regional spare parts stores and workshops. For this project the foreign assistance is needed in financing, and technical assistance for training and management.

The A.E.C., in a near futur will reinforce the facilities of Repair and Maintenance in state farms themselves and is engaged in a crash program of training technicians and mechanics.

In general since 1974 the imports of tractors are not duty free except if it is for governmental institutions. But the

.../...

imports of spare parts are duty free. The manufacturers who sold implements are engaged to furnish spare parts for ten years.

4°) Extension

The institution involved in this subject is the Extension and Project Implementation Department in the Ministry of Agriculture.

Until now, the extension is essentially made for fertilizers and high yield seeds, farm mechanization was not considered as an essential input. In fact extension applying the results of research, very few could be done in this subject considering the level of research in Agricultural Mechanization.

5°) Small Scale Industry

In 1978, was established with the help of U.N.I.D.O. the Handicraft and small Scale Industry Agency (H.A.S.I.D.A.) with the purpose of promoting and co-ordinating the development of handicrafts and small-scale industries, and with the additional duty of promoting the establishment of service and producers' co-operatives among craftsmen, registering, supervising and assisting them.

The Hasida has :

- to formulate and supervise the implementation of policies
- to carry out surveys and research
- prepare projects and assist those who are implementing those projects
- organize and operate demonstration and training centres
- assist small scale industries in marketing, supply of raw materials and equipment management, in training and obtaining credits from banks
- regulate and issue licences to small scale industries.

Hasida is divided in three departments :

- Industrial promotion department
- Project preparation department
- Co-operatives promotion department.

And Hasida is also in charge of the Handicraft Centre.

If Hasida is also concerned by the promotion of Agricultural Machinery Industry, this subject is not its first priority.

.../...

The main constraints for the development of small scale industries in Agricultural Machinery are as follows :

- The lack of appropriate designs
- The lack of a market (related with the lack of proper extension)
- The correct supply in raw materials, linked with the problem of transport in rural areas.

This very new institution is not yet fully effective, but could be a good support for the establishment of linkage between Research in Agricultural Machinery and Industry.

6°) Training

There is a section in Agricultural Engineering at the University of Addis Abeba and a college of technology. The Technicians are trained in some technical schools and a Polytechnic college where there is a unit for agro mechanics.

The National Productivity Centre is in charge of training technicians already working. But there is no special training in Agricultural Machinery.

The government has to face an important lack of trained technicians in all industries.

This is the reason why was started a crash programme of training technicians, the length of training will be reduced and the number of trainees increased in each training centers.

Some assistance is required in financing, providing of teachers and installation of facilities for training in Agricultural Machinery.

7°) Standardization

There is an Ethiopian Standardization Centre, but this Centre does not work in the field of Agricultural Machinery Industry.

This institution could be used if a policy is defined, and if research provides some designs to the industry and some conditions which could be drawn as standards.

K E N Y A

I - SOME DATAS AND FACTS ABOUT KENYA

- Population 14,732 Millions of inhabitants in 1978.
- Population in rural areas represents 85 % of the total.
- Total area 569.200 square kilometers and 17 % in arable lands.
- High population annual growth rate of 3,5 %.
- 50 % of export earnings come from primary products.
- Agriculture contributed in 29 per cent of G.D.P. in 1975.
- Land tenure

The main figure is the division of land into small holdings.

In 74-75, 76 % of the holdings had an acreage less than 3 acres (1,2 ha) and 3,47 % only are more than 8 acres (2 ha).

In 74-75, for a total area cultivated of 1,230,000 ha, 1,038,000 were cultivated with hand tools, 150,000 ha with ox-ploughs and 42,000 ha with tractors.

The small holdings (less than 8 acres) product 50 % of the gross marketed production.

II - POLICY ASPECTS

The new five years Development Plan (1979-1985) is just edited. The main figures in Agricultural Mechanization and Agricultural Machinery Industry are as follows:

a) Agriculture

Agriculture is the key to the Plan's objective.

The strategy for overcoming constraints contains 7 elements :

- more intensive land use and development with additional input fertilizers and by making available for crop some lands (irrigation, drainage)

.../...

- development of appropriate technologies
- small holder development
- arid and semi-arid development
- a poverty alleviation focus
- market incentives
- increased access to land and land based employment.

b) Industry

The emphasis is on the raw materials furnishment and the dispersion of industrial activity throughout the country, this industry will use labour intensive methods of production.

This program will be supported by the encouragement for research and development institutions to be effective in transfer, adaptation and development of specific appropriate tools and technologies for the rural areas.

The Plan is implemented as such :

* Emphasis in Research on innovation which lend themselves to land use intensification.

The new agricultural research programme includes the agricultural engineering project which is to be concerned with the development of appropriate technologies for small farm production, power cultivation machinery, produce processing and soil and water conservation.

In association with crop research so that tillage equipments meet the need for early planting or intercropping.

Conducted at the Kenya Agricultural Research Institute in association with the University of Nairobi. And related to the Agricultural Equipment Improvement project.

* Popularisation - Extension

Further efforts will be made to close the gap between research and the farming community by the participation of extension personnel in pre-extension trials, in a program bring farmers to cultivate in research stations and by of monitoring information on extension programmes as research problem identification.

* Agricultural Education and Training

Some programmes have been envisaged

- Fostering the action c
by creation of three mo.
mobile units

.../...

- Expansion of the both Institutes of Agriculture and building of a third
- Expansion of the Diploma training at the Egerton College
- And the faculty of Agriculture at the University of Nairobi in relation with the faculty of engineering will expand the training programmes on agricultural engineering.

* Promotion of small scale industry

The programme which will be undertaken by the Kenya Industrial Estate includes, among others, an appropriate farm implement and equipment programme implemented as follows :

- Systematic testing and evaluation of farm implements will be carried out to identify the tools most suitable to each area
- Small scale manufacturers in different areas will be encouraged to up grade their level of technology and skill both in respect of design and fabrication to enable them to take up the manufacture of such items.

The land and Farm Management Division of the Ministry of Agriculture will co-ordinate all the institutions involved in the exercise.

* Industrial Development Programme

This programme includes also some plans on agricultural machinery industry.

+ In basic metal industries 3 main projects :

- a mini integrated steel plant 250 000 to 300 000 tons of steel per year
- a grey iron foundry 3 000 t per year
- a manufacture of pumps.

+ In machinery industry

There is a programme of setting up two plants to manufacture agricultural machinery and implements :

- a unit to manufacture post harvesting machinery such as threshers, shaff cutters and other agricultural processing machines
- a unit to assemble electric and pneumatic powered hand tools.

.../...

In conclusion we can see that the Agricultural Machinery Industry and the Agricultural Mechanization are fairly well envisaged in the five years Development Plan.

But the development of this industry has to face some problems :

- A limited market only 10 % of the farmers can afford simple implements in place of hoes
- The lack of technical facilities like forging
- And casting facilities even if the set up of a small foundry is planned.

The kind of assistance that would be relevant is mainly a technical assistance in technology transfer from developing countries and a financial assistance from industrialized countries or international organisations.

III - TECHNICAL ASPECTS

The following figures (investigated in 1976) give an idea of the relative importance of hand labour, animal power and tractor power on small holdings.

	No of holdings
Estimated total holdings	1 231 700
Estimated total ox-ploughs	30 000
Estimated privately owned tractors	400
Tractor Hire Service	54

The percentage in acreage of their contribution to land preparation is estimated as follows :

Tractors	: 3 %
Ox-ploughs	: 12 %
Hand prepared	: 84 %

i) Category I and II

a) Situation of the Agricultural Mechanization

Animal powered mechanisation has previously not been a Government priority. Only a limited expansion has been achieved.

Reasons for this have included :

- Poor marketing
- Distance of manufacturers from farmers
- Lack of farmer education

.../...

- Lack of credit facilities
- Problem with the suitability of the technology
- Problem of accomodation with the draught animals on the holdings.

And where ox-power is used it is usually confined to ploughing (one furrow plough), cultivators being rare and harrows, seeders or fertilizer applicator unknown.

Ox and donkey carts are more widely used but are to be found only in a ration of one quart to every five pairs of draught animals.

b) Agricultural Machinery Industry

This industry is mainly located in rural areas, however some industries producing harrows, hoes, wheel-barrows, ox ploughs, machetes, and showels can be found in Nairobi (Kenya, Industrial Estate, and some private manufacturers) and other towns.

The rural manufacturing stays for Rural Industrial Development Centers (R.I.D.C.) under the umbrella of the Kenya Industrial Estate (organisation which deal with the fostering of small scale industries).

Also in many villages there are craftsmen who repair and do some fabrication to order. The majority of these men have the skills required to extend their business but need both the capital and the design information.

The research in this field is undertaken by the Rural Technology Research and Development Center (in the past called Agricultural Machinery Testing Unit) in Nakuru. The Center works under the supervision of the Land and Farm Management Division of the Ministry of Agriculture.

The K.I.E. on its side operates a Product Development Unit in some of its R.I.D.C., this unit deals also with research.

ii) Category III

The 3 % of holdings using powered equipment are highly mechanized.

The following figure of imports gives us an idea of the problems involved in tractors imports.

Year	No of countries from which tractors are imported	No of tractors imported
1975	9	1 388
1976	15	1 271
1977	13	2 753

.../...

The increase of country from which tractors are imported and the wide range of tractors result in a tremendous problem to resolve spare parts furnishment and after sale services.

All the sales of tractors and the after sale services are in hands of private dealers who are in a great competition. Some of them engage themselves in long term contracts including total repair, maintenance and even training of the drivers.

The hire services were also developed, on one hand by the Land and Farms Division (= 110 tractors) whom the aim is to create a market and foster the creation of private hire services, on the other hand by private companies.

Tractor assembly is partially made in P.K.D. by some dealers. Partial manufacture is done for disc ploughs : the discs are imported and the frame is made locally.

The government policy in this field is to foster the partial manufacture of tractors. But the problem is to know which type of tractor.

The main trend followed by the Industrial Survey and Promotion Center (institution involved in analysis of proposals and negotiations of suitable arrangements) is the fostering of partial manufacture of a simplified tractor . In this purpose a wide range of tractors between 15 to 25 horse power has been tested by the Agricultural Machinery Testing Unit and the faculty of Engineering is starting with the assistance of U.N.I.D.O. a programme of testing some of these tractors in order to prepare partial manufacture.

Assistance would be required in :

- Financing
- Testing, adaptation, and design of suitable prototypes
- Expertise in the field of equipment suitable in the developed countries.

The main constraints are :

- Economy of scale
- Lack of know how and experience
- Lack of ancillary services (forge, foundry) which are planned in the new development plan.

iii) Category IV - Specialized Machinery

There are very few equipments in this category only some combine harvesters in large scale items, and there is no plan for local manufacture of tractors, all is done by private dealers.

IV - INSTITUTIONAL ASPECTS

a) Government policy in the field of technology transfer

The institution involved is the new National Council for Science and Technology just established this year.

This institution will advise on the appropriateness of the Technology prior to acquisition.

The functions of the agency will be harmonized with those of the Bureau of Standards, the Industrial Survey and Promotion Centre and the Agricultural Machinery Testing Unit.

b) Research and Development

Institutions involved are Agricultural Research Institute, in association with University of Nairobi faculties of Agriculture and Engineering and the Agricultural Machinery Testing Unit.

The emphasis of their research is on animal drawn implements and simple tractors in order to foster the manufacture of these implements.

c) Repair and maintenance

For the implements of categories I and II the repair and maintenance is done by rural blacksmiths.

For the powered machinery the Repair and Maintenance is done by dealers themselves who are in competition, and the system varies from one dealer to another but generally where powered machinery is well developed, dealers are providing some after sale services.

There is no national organisation involved in this subject.

The Development Plan indicates that "Agricultural Capital and Supplies will, in general, remain free of import duty".

d) Extension

In the hands of the Ministry of Agriculture for the Agricultural Mechanization and of K.I.E. for the Industry.

Extension is done by pilots models, testing and demonstrations in the fields of the farmers.

The main problem in this subject is the proper establishment of relationships between research and extension in order to provide appropriate implements to extension and feed back to research. And this problem seems to be particularly up-to-date in Kenya.

.../...

e) Training

As we saw in the Development Plan training is done in Agriculture at the three levels. But it is only since three years that there is an Agricultural Engineering training in the University of Nairobi.

The first promotion trained is of 8 students and in the first year there are 27 students.

This training of Agricultural Engineers is planned to be followed by a post graduate programme in irrigation and soil conservation.

The major problem as in most of the developing countries is the training of technicians.

f) Finance - standardization

There is a custom protection for local products. Imports of goods equivalent to those made locally are not allowed. The specifications are tested by the Agricultural Machinery Unit and the Kenya Bureau of standards defines the standards of goods produced.

There is no credit provided to foster the farmer's equipment.

But the K.I.E. provides some assistance in the finance-ment of small scale industries (credit for investment) specially in the field of Agricultural Machinery Industry.

g) Small scale industry

The institution involved is the Kenya Industrial Estate which aim is to promote the African Entrepreneurs by providing them :

- studies
- finance
- technical and management services.

The K.I.E. provides entrepreneurs :

- in technical assistance
- in project studies
- in buildings which are rented
- in credits.

There are two programmes, one rural programme which deals mainly with Agricultural Machinery Industry and also with

craftwork. The objective is to develop small Industries in rural areas.

We saw that this industry made quite a lot of the implements in categories I and II.

We spelled out earlier in conclusion of the policy aspect what were the major problems of this industry and what sort of assistance could be provided.

TANZANIA

I - SOME FACTS ABOUT TANZANIA

- Population 17,5 Millions inhabitants (1978).
- 94 % of the population live in rural areas.
- 90 % of the economically active population is engaged in agriculture.
- Agriculture contributed in 1977 roughly 38 % of Tanzania's G.N.P. and generates over 70 % of total export earnings.
- Land tenure

Predominantly small peasant farmers who cultivate 90 % of the total area farmed (400 to 500 thousands hectares).

The main character of the rural structure is the organisation of the peasants in collective units called UJAMAA VILLAGES which they formed on a voluntary basis.

The aim is for every village to become an economic unit with peasants working comunally and co-operatively using modern methods of production for the benefit of all.

In 1977, 90 % of the entire rural population were registered in villages.

Above village level, groups of villages can organize together for social, educational and economic reasons for example the organization of craft industries or agricultural implement workshop.

There are also some state farms highly mechanized which are specialized in selective agricultural products (61.000 ha about).

II - POLICY ASPECTS

There is a difference in the stage of policy making between Agricultural Mechanization where there is at present only a draft document not yet made public and the Agricultural Machinery Industry policy which is well defined and where some realisations began already to work.

a) Agricultural Mechanization

A recently prepared policy document concerning all aspects of agricultural mechanization in Tanzania will be made public in the near future.

Assistance in the formulation of this policy was provided by F.A.O. F.A.O. is providing continued assistance for programming and planning for agricultural mechanization development within the guidelines of the policy.

The emphasis will be on the animal drawn equipment thus following the directives recently given by the government.

The research and development and the training in Agricultural Mechanization will be fostered in order to fill the present lack in those subjects.

b) Industry

The emphasis of the industrial policy is on the basic industries like :

- Metal Engineering
- Chemicals.

These industries are supposed to provide inputs to Agriculture to reach the self reliance in food production which is the first priority that the country has to face at present.

For the moment only one factory is making hand tools and animal drawn equipment. This factory is in Dar es Salaam.

A present one another is in building in M'Baeya and is planned to produce hand tools, animal drawn implements and also some tractor drawn implements.

Two projects are studied :

- a factory for tractors implements
- an assembly plant for tractors.

The industrial policy is also trying to foster the development of small workshops and rural industries to produce some simple farm implements this is done under the supervision of S.I.D.O. (Small Industry Development Organisation).

III - TECHNICAL ASPECTS

1°) Situation for each categories

a) Cat. I and II

Local manufacture is confined mainly to hand tools and animal draught equipment.

Domestic production figures are given below for 1976/77 :

Hoes	:	180.000	pieces
Axes	:	80.000	"
Ox ploughs	:	10.080	"
Ox carts	:	1.000	"
Ox harrows	:	400	"
Ox ridgers	:	20	"
Ox planters	:	40	"
Ox interrow cultivators:	:	46	"
Groudnut shellers	:	200	"
Winnovers	:	20	"

All are produced in the Ubongo Farm Implements Factory located in Dar es Salaam.

The capacity of the new factory of M'Baeya is planned to be 2/3 of the capacity of the U.F.I.

A national survey carried out between 1976 and 1978 revealed that the numbers of ox drawn implements, at present in the country (for regions only instead of six were covered) are roughly as follows :

Ploughs	:	163.000	pieces
Ridgers	:	760	"
Harrows	:	6.000	"
Planters	:	3.000	"
Carts	:	1.821	"

These datas represent about 60 % of the actual situation.

b) Cat. III

All tractors and tractor-implements are at present imported.

Control of quantities imported is under the Bank of Tanzania. Types of implements imported are, in general, determined by traditional sales patterns.

Tractors and implements are imported by private Companies and parastal institutions (A.I.S.C.O.).

Sales of tractors and implements have decreased since 1974 partly due to the results of worldwide inflation and partly due to the government's awareness of the real cost of operating powered machinery.

The estimation of the situation is as follows (1976-1978 survey) :

Tractors roughly	:	7.000
Disc ploughs	:	2.400
Trailers	:	1.300
Chisel ploughs	:	200

.../...

Cultivators	:	350
Planters	:	500
Seed drills	:	250
Sprayers	:	300

The survey did not covered all the country but we can estimate that these datas represente 60 % of the actual situation.

Category I - Hand tools, animal drawn machines

The present Government policy is on two trends :

- the strengthening of Farm Implements factories
- the encouragement of the manufacture of this implements in the villages (Ujaama) by the action of S.I.D.O.

Factories are U.F.I. (see first paragraph) and for ox-carts T.A.M.T.U. (see in Institutional Aspects).

Research is done partly by T.A.M.T.U. and by the factory it self.

Category II - Intermediate Machinery

Few is done at present in this field generally animal drawn pl ughs are done local y and plans are done to product those implements in the country.

There is no real licensing policy as far as Agricultural Machinery is concerned. The trend of the policy of industrialization is to product all farm implements in the country.

The IIInd category is generally recognized as a necessary step toward IIIrd cat., however large scale commercial farming is dependant on powered machinery (states farm for plantations and seed production).

Category III - Powered Machinery

This category is limited to the mechanization of the states farms.

Sales of tractors and associated implements is likely to continue and possible increase to the large scale commercial farming in state farms.

Village farming is heavily dependant on human an animal power. Attempt, to date, to introduce tractor power have not met with success and sales to this sector have therefore declined.

At present about 100.000 ha are cultivated by tractors for 8,5 Millions of ha cultivated.

All tractors are already imported by private dealers and one parastatal company. The sales of this company (the most important) give an idea of the market in 77/78.

Tractors	:	220
Ploughs	:	110
Chisels	:	70
Cultivators	:	64
Ridgers	:	25
Ditchers	:	10
Harrows	:	34
Planters	:	61
Balers	:	6
Combines	:	1
Forage harvesters	:	9

The assembly plant on project with bilateral assistance will integrate some components already made in the country radiators, gas pots, batteries and the policy is to integrate as much as possible.

The National Development Corporation, under the Metal Engineering Division of the Ministry of Industry is in charge of analysing proposals and to negotiate suitable arrangements in cooperation with other countries.

The International Assistance mainly required is a financial assistance.

The main constraints pointed out for a local manufacture are :

- the product suitable for the local conditions
- the facilities
- the finances
- and lack of proper manpower.

Initial studies have been done for the establishment of foundry.

Category IV - Specialized machinery

The limited demand (State farm) will continue. All likely to be imported due to the relatively small demand. No scarcity of suitable machines for import.

IV - INSTITUTIONAL ASPECT

1°) Government Policy in the technology transfer

A National Appropriate Technology Committee has recently

been established to cooperate and coordinate with similar committees in Commonwealth Countries. It is hoped that this committee will result in the exchange of technology and establishment of trade between the countries.

2°) Design and development

Some institutions are involved in this subject :

+ T.A.M.T.U. : Tanzania Agricultural Machinery Testing Unit located in Arusha.

In T.A.M.T.U. are included some divisions which show the aim of the institution.

- Design and Development division

- Testing division

- Production division : workshop making ox-carts mainly, plus two furrow ploughs, planting attachment for these ploughs, planters, harrows, interrow cultivators, seed mixers. The production is very low due to the size of the workshop.

- Village Technology Section :

This division was created with assistance of I.L.O. and its aim is to teach villages inhabitants in implements usage, repair and maintenance with skills and materials found in the villages this teaching is done in villages themselves.

Recently T.A.M.T.U. has been handed over by the Ministry of Agriculture to the Ministry of Industries. Little is now known of its new role, it seems that the testing activity will be withdrawn to the profit of the production activity and the teaching activity. And plans are made for research and testing centres under the Ministry of Agriculture.

+ S.I.D.O. (see Small Scale Industry Promotion) which includes a Research and Planning Division.

+ U.F.I. (Uhongo Farming Implements) Company, where applied Research is done to adapt prototypes to the conditions required in the factory.

The priority areas are the development and selection of available equipment to suit specific farming systems.

At present power tillers and simple tractors do not seem to be taken in consideration.

In the field of Research in Agricultural Engineering a project has been prepared by the Crop Development Division of the Ministry of Agriculture. The title of the project is :

.../...

"Agricultural Engineering and Farming Practices Research Project".

The objective of the research programme would be to increase the productivity of both big and small farms through the integration of tools, machinery and equipment into the farming systems. Thus the research will be not only in design, and testing but also in establishment of proper farming systems.

+ Some institutions had been recently created

- Tanzania Industrial and Research Development Organization (T.I.R.D.O.).
- Institute of Design and Engineering (I.D.E.).
- Metallurgy Engineering and Industrial Development Association (M.E.I.D.A.).

Those institutions are not yet effective, but are an example of the emphasis that the government put on the development of the basic metal working facilities.

- + UYOLE Farm : This estate farm does some testing of specialized machinery and powered equipment.

3°) Repair and Maintenance

At the moment for the Cat. I Repair and Maintenance are done by local blacksmiths and craftsmen.

For the Category III Repair and Maintenance are done in the states farms and it seems that it is an important problem, if we take in consideration a survey made in 1975 by F.A.O. where it is shown that a great number of machines (mainly tractors) were not used because of lack of spare parts and proper repair.

The spare parts are imported duty free when it is for the usage in Agriculture.

The main constraint in this field is the lack of skilled manpower specially mechanics.

4°) Extension

Is done by the Ministry of Agriculture, T.A.M.T.U. and by the U.F.I. Factory, the general impression is that this activity should be strengthened and coordinated with the other activities.

5°) Training

- Facilities and curricula exist at the Faculty of Agriculture, University of Dar es Salaam; Morogoro, for B.Sc, M.Sc and Ph.D degrees in Agricultural Engineering.

.../...

- Diplomas are offered in Agricultural Mechanization at the Ministry of Agriculture Training Institutes at Tanya and Mwanza, Mechanics at Dar es Salaam, and Arusha Technical Colleges of the Ministry of Agriculture. There is an Agro Mechanization Centre at Mwongo, Rufigi, (Coast Region) which trains operators.

Other Agricultural Training Institutes exist and offer varying levels of training for operators.

All the above institutions of training need strengthening and much opportunity for international assistance exist.

In fact, in the Crop Development Division of the Ministry of Agriculture it is felt that very few Agricultural Engineers are trained and that the training in this subject is one of the basic priorities. They plan to increase the number of agricultural engineers involved in research from nil to 41 graduate and post graduate staff by 1990.

6°) Standardization

The Tanzania Bureau of Standards (T.B.S.) is the institution in charge of standardization T.B.S. is new, it started its work in 1978 and until now no work had been done in the field of Agricultural Machinery, even if it is planned as one of the priorities of the T.B.S.'s programme.

The main problem is to get the informations from the institutions in charge of Research and Development of Agricultural Machinery. However, a committee has been setted up in order to standardize imports of tractors, but until now no decisions had been taken.

Already T.B.S. is in relation with other standardization organisations in industrialized, and developing countries.

7°) Small Scale Industry

The institution is S.I.D.O. : Small Industry Development Organisation.

S.I.D.O., deals with Industrial Estates. Three of them have been already established and 14 are in setting.

S.I.D.O. provides help by :

- Information
- Training
- Pre investment advises
- Post investment advises
- Pre feasibility studies
- Technical and Economical Surveys.

.../...

S.I.D.O. considers and fosters three levels of production of Farm implements.

a) Villages, rural level, production of hand forging items.

b) District level : Heat treatment.

c) Regional level : Pneumatic hammers.

S.I.D.O. is undertaking a vast programme of development of small industry in villages called UTONDO.

- The main problem that this kind of industry has to face are :

- lack of foreign currency for purchase of raw material

- lack of trained manpower.

- Assistance would be required :

- In the providing of Experts on blacksmiths work with kits of tools to set up a programme of training in several areas (20).

- In the setting up of a forging factory.

ANNEXES II

NAMES AND ADDRESSES OF PERSONS AND SERVICES VISITED

ETHIOPIA

<u>Name</u>	<u>Fonction</u>	<u>Service</u>	<u>Address</u>
A.K. MITRA	UNIDO Reg. Adv. Eng. Ind.	ECA/UNIDO joint Industry	P.O. Box 3005 Addis Ababa
HAMMERSLEY	FAO project Manager	Agricultural Research	P.O. Box 138 NAZRET
KEBLEDE ALI	General Manager	National Productivity Center	P.O. Box 3246 Addis Ababa
Nils SJOEBLOM	UNIDO Adviser	HASIDA	P.O. Box 5738 Addis Ababa
Shifferaw JAMMO	General Manager	Project and studies Preparation Agency of the Central Planning Suprême Commission	Ministry of Industry
/ HIWOT / EGZIABHER	Financial Manager	Metal Tool Corporation	Ministry of Industry
ALDU	General Manager	Suprême Plan Council	Ministry of Industry
DE WOS	Ass. Manager	"	"
ILU sebsibe	General Manager	Agricultural Engineering Corp.	State Farm Authority
CKLEMARIAM	Head of Agricul- tural Engineering Department	Institute of Agricultural Research	P.O. Box 138 NAZRET

KENYA

<u>Name</u>	<u>Fonction</u>	<u>Service</u>	<u>Address</u>
GILL	UNIDO Adviser	Industrial Survey and Promotion Center	P.O. Box 30430 Nairobi
KOTUT	General Manager	I.S.P.C.	"
KILU	Technical Manager	"	"
Prof. Rajni PATEL	Dean of faculty of Engineering	University of Nairobi	P.O. Box 30197 Nairobi
MUCKLE TB	Project Coordinator FAO	Agricultural Equipment improvement project	P.O. Box 470 Nakuru
SHIKHULE	Operation Manager	Kenya Industrial Estates	P.O. Box 18282 Nairobi
NYAGA	Farm Management Division	Ministry of Agriculture	P.O. Box 30028 Nairobi
MUKOLWE	"	"	"

TANZANIA

<u>Name</u>	<u>Fonction</u>	<u>Service</u>	<u>Address</u>
HAULE	Metal Eng. Div.	Ministry of Industry	
MANENO	Crop Develop. Div.	Ministry of Agro	P.O. Box 9071 Dar es Salaam
TULAPONA	Ass. Manager	Tanz. Agricul. Mach. Testing Unit TAMTU	P.O. Box 3101 Arusha
MALAI	Senior Consultant	Tanz. Industrial and Consulting Organization (TISCO)	P.O. Box 2650 Dar es Salaam
MWOBAHE	Director	Tanz. Bureau Standards	P.O. Box 9524 Dar es Salaam
BAPURAJ	Manager of Technical Service	Small Industry Dev. Organization (SIDO)	P.O. Box 2476 Dar es Salaam
KANNYAN	Farm Impl. Div.	(SIDO)	(SIDO)
A.J. TAIRO	General Manager	Agricultural and Industrial supplies Company Ltd (AISCO)	P.O. Box 4797 Dar es Salaam
M'GABO	Senior Engineer	"	"
M'BENA	Farm. Impl. Division	National Develop. Corp.	B.P. 3402 Dar es Salaam
DAGG	FAO project Manager	Agricultural Mechanization Development	Avalan House Dar es Salaam

