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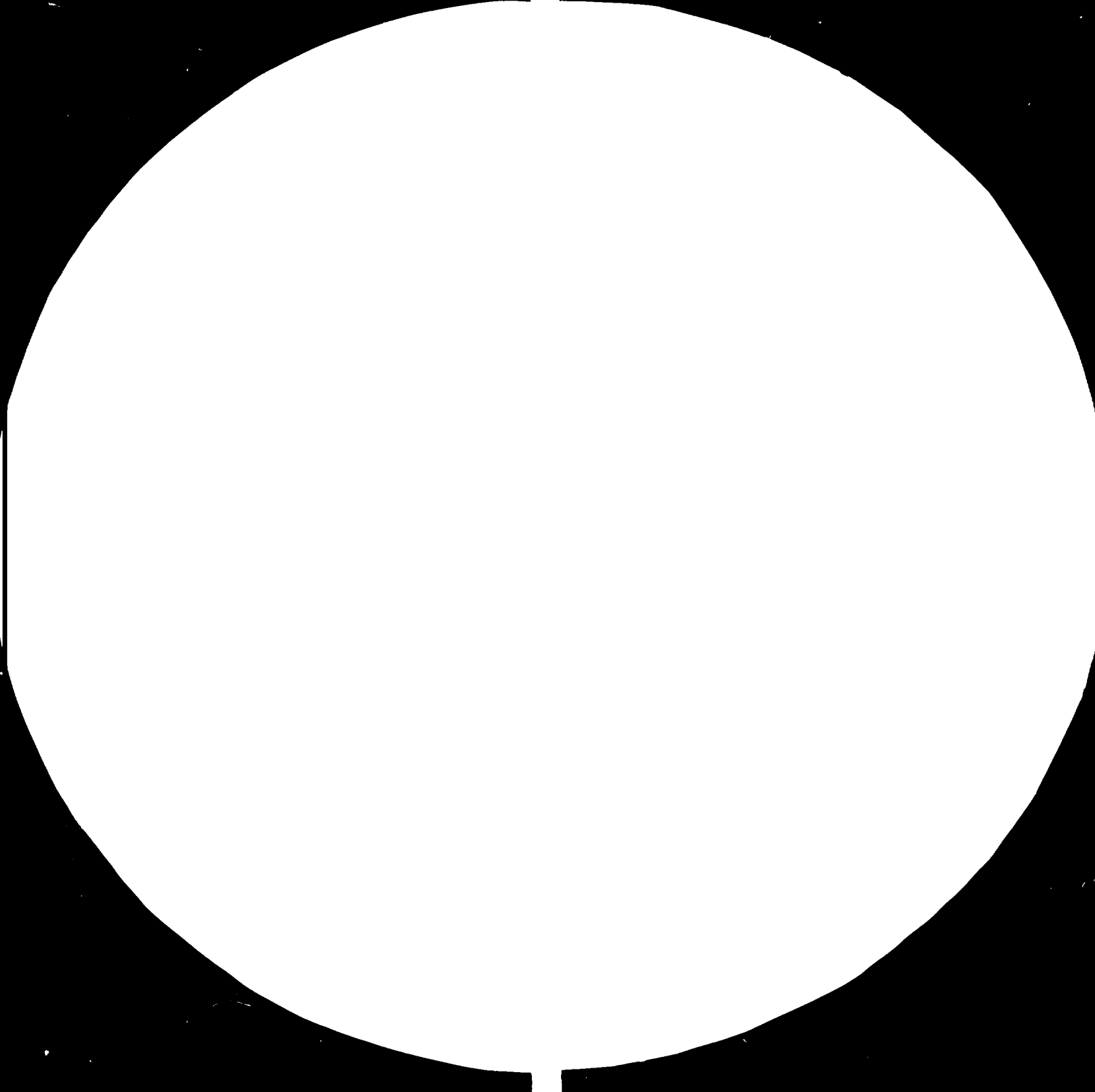
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1984

Tanzania.

SOME RECENT EXPERIENCES IN THE PLANNING AND

MANUFACTURING OF FARM IMPLEMENTS

IN TANZANIA ,

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EXPERT GROUP MEETING ON THE DEVELOPMENT OF
MULTIPURPOSE AGRICULTURAL MACHINERY PLANTS
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SOME RECENT EXPERIENCES IN THE PLANNING AND MANUFACTURING
 OF FARM IMPLEMENTS IN TANZANIA

Synopsis

Tanzania is putting great emphasis on agriculture, both for cash crop for food sufficiency and for export to earn needed foreign exchange. Yet for the last three years from 1981 - 1983 there has been great shortage of farm implements especially to the ordinary farmers in the villages who produce more than 90% of the agricultural products in the country.

Having realised this major constraints to agricultural production under the present system the government through the Ministry of Industries and Trade embarked on concrete programmes to solve the problem. This paper tries to explain the efforts made, the cooperation received from regions, ministries and institutions, as well as from foreign donors and local manufacturers. It points out the achievements made and the problems encountered, in trying to meet the needs of farm implements through manufacturing the same in multipurpose plants.

The paper concludes by pointing out further areas of improvements and indicates the sort of assistance which international organisations such as UNIDO can render to enhance local efforts in developing countries in as far as farm implements manufacturing is concerned.

Although the paper has been written and is to be presented to the UNIDO organised meeting in Conzaur, China (13 - 18 November 1984) by the Director of Heavy Industries, the views and any errors contained in the paper are personal views of the author and not necessarily those of the government of Tanzania or the Ministry of Industries and Trade.

I. THE COUNTRY AND HER ECONOMY

1.1. The Country Situated in Eastern Coast of Africa, the United Republic of Tanzania is a union (Since 1964) between the former Tanganyika (mainland) and Zanzibar (Island). It has a population of 19 million in an area of 945,000 km². of whom nearly 90% live in the rural areas engaged in subsistence farming. Population has been growing at 3.2% per annum.

1.2. The Economy:

The real GDP at 1966 constant prices was Tsh 11,671 (US \$ 686.5) in 1983 with income per capital of Tsh 589 (US \$ 34.6) Tanzania is thus among the last countries of the 25 countries classified as Least Developed (Countries (LDCs)

1.3. In current prices industrial production was Tsh 4,263 in 1983 contributing 9.2% of the GDP with agriculture contributing 33.3%. Both sectors show a declining trend when compared to their 1980 outputs.

The ratio of capital formation to the GDP was a mere 16.7% (declining from 20.2%).

1.4. Apart from low investments major contributory factors to the poor state of the economy has been shortage of foreign exchange to import required in-puts for production (raw materials, spare parts, farm implements, fertilisers etc). Industrial production also suffered due to frequent cuts in water and power (the total installed power of 377 MW not withstanding). Other factors are poor management and shortage of experienced manpower especially technical and materials management manpower.

1.5. AGRICULTURAL AND INDUSTRIAL POLICIES

The guiding policy in all spheres of activities has been the Arusha Declaration of 1967 which lays great emphasis on socialism and self-reliance. In agriculture the 1983 policy document (The New Agricultural Policy) has of late supposed to provide the inspiration for increased production using improved methods and efficiency. It allows for both public as well as private farming but with the former been favoured in terms of government financial assistance.

In industry the policy was pronounced in the third five year plan (1975/76 - 1980/81). The policy is to have a strategy that lays priority to providing the basic necessities to the people and the provision of basic engineering and chemical industries utilising available natural resources. It also emphasizes the building up of the necessary industrial infrastructures such as industrial consultancy services, engineering design centre, institution of industrial standards and industrial research and development.

- 1.6. Private investment in both industry and agriculture is allowed including through the establishment of joint ventures.

2. Installed Facilities for Farm Implements Manufacturing

- 2.1. The history of factory based farm implements manufacturing in Tanzania started in 1970 when the Chinese built Ubungo Farm Implements

Company (UPI) started production in Dar es Salaam. Before that time all implements used to be imported from abroad. There were also cottage based village blacksmiths who were and are still making simple implements, such as knives, small tanged hoes (less than 0.5kg in weight), sickles etc.

- 2.2. After ten years UPI was expanded to the present capacity which is shown in Table 1 below.
- 2.3. In 1983 another factory built with assistance from India started production in Mbeya. It is called Zana za Kilimo (ZZK), Mbeya. Its installed capacity is shown in Table 1. Although only hand and animal drawn implements are shown the intention is also to produce some tractor drawn implements as well. But no figures can for the moment be produced for this.
- 2.4. Up to now Production at ZZK has started only for hoes and ploughs. No production has started for the tractor drawn implements. Whereas UPI specialised in the production of the ordinary 2½ lb and 3 lb round eye hoes ZZK is also making the tanged hoes of up to 3½ demanded by the farmers in the southern regions of Mbeya, Mwanza and Ruaha (the so called Ufipa and Rungwe hoes) which used to be imported.
- 2.5. A third factory, which, like the other two will be 100% owned by the public through the National Development Corporation under the Ministry of Industries and Trade, will be built next year in Mwanza. The proposed capacity and product mix at the Mwanza

TABLE I

LOCAL PRODUCTION CAPACITIES OF FARM IMPLEMENTS:

* These are tractor drawn implements the rest are hand and animal drawn

I T E M	INSTALLED PRODUCTION CAPACITIES (PCS)				
	UFI	30K-MBEYA	MEIDA	SIDO	MWANZA
HAND HOES	1,900,000	750,000	250,000	50,000	1,900,000
ENCUCLES	20,000	10,000	5,000	5,000	20,000
AXES	-	125,000	-	-	50,000
MATCHETS	-	200,000	250,000	-	200,000
SHARES					20,000
HARROWS					400
CULTIVATORS PLANTERS EGGERS					700
DISC PLOUGHS*					600
HARROW*					400
CULTIVATORS AND PLANTERS *					200
FURROWERS*					400
COFFEE PLOUGHERS*					

TABLE II**AVAILABILITY OF FARM IMPLEMENTS 1980 - OCTOBER, 1984**

	A V A I L A B I L I T Y (P O S)					ESTIMATE DEMAND (1984)
	1980	1981	1982	1983	as at 31/10/84 (1984)	
HAND HOES	1,863,509	1,193,655	2,192,174	2,730,616	3,166,149	3.7 million
PLOUGHS	15,398	6,489	16,508	32,762	90,897	100,000
PLOUGH SHARPS	99,801	-	86,002	268,080	309,535	350,000
MATCHETS	727,960	61,900	720,446	70,393	312,467	1,200,000
AXES	133,798	55,512	104,748	536,072	68,022	264,000

TABLE III

FARE DIFFERENTIALS PATTERN AT UFI (1981 - OCT. 9, 1984)

YEAR	ITEM	HAND HOES	PLOUGHS	PLOUGH SHARES	AXES	MATCHETS
1981	Local	1,227,969	4,845	753	-	-
	Foreign (Imported)	185,853	1,644	-	55,512	61,920
	Distribution	1,193,655	6,489	-	55,512	61,920
1982	Local	898,986	11,057	30,047	-	-
	Foreign (Imported)	1,293,188	5,446	55,955	104,748	720,446
	Distribution	2,192,174	16,503	86,002	104,748	720,446
1983	Local	1,455,720	24,120	241,164	-	-
	Foreign (Imported)	1,058,627	6,709	13,856	70,375	536,006
	Distribution	2,514,347	30,829	255,020	70,375	536,006
Jan - Oct.9, 1984	Local	1,720,516	23,712	161,978	-	-
	Foreign	464,430	52,449	69,745	61,861	153,731
	Distribution	2,184,946	76,161	231,723	61,861	153,731

Farm Implements Factory which is to be built with assistance from Bulgaria is shown in the last column of Table I.

3.0. Implements
Performance and Problems in Farm Manufacturing:

The major problems in farm manufacturing in Tanzania may be listed under the following ten headings:-

- (1) Lack of foreign exchange to import the required raw materials, spare parts, and tools.
- (2) Lack of reliable data on market demand, trend and choices including improved production methods.
- (3) Management Problems at the plant level.
- (4) Shortage of qualified and experienced personnel especially technical, materials and financial management.
- (5) Distribution problems related to allocation of products and confined marketing channels.
- (6) Uneven demand over the year (seasonal demand)
- (7) Poor capital structure of the Regional Trading Companies (RTCs).
- (8) Low installed capacities before ZZK came into production.
- (9) Lack of timely response from institutions with regard to government directives and programs.
- (10) Inadequate coordination at the national level.

4.0. THE CRISIS OF 1981/82:

4.1. Each one of the above problems could be explained in detail how it contributes to the shortage of implements in the country especially during 1981 and 1982. However this is not the main purpose of this paper. The implications for each one of them is obvious and the combined effect resulted in what may be called the crisis of 1981/82 regarding farm implements.

4.2. The crisis may be observed from examination of Table II and III above. It will be seen that for the three most important products, namely hand hoes, animal drawn ploughs and plough shares (required as replacement for old ploughs) there was a big trough for 1981 and 1982. Whereas the national demand is estimated at 3.7 million for hoes, 100,000 for ploughs and 350,000 for plough shares the actual availability which includes local production and importation, dropped from 1,863,549 and 15,378 and 99,801 in 1980 to 1,193,655 and 6,489 and zero in 1981 for the three products respectively. The situation improved slightly in 1982 when the availability was 2,192,174 and 16,508 and 86,002.

4.3. The improvement did not help the situation very much however, and the cry could be heard everywhere. Questions were asked in Parliament and the press and radio were giving stories about the shortage. The government had to do something about it because it threatened the whole economy of the country.

5.0 SOLUTION THROUGH PRODUCTION IN MULTIPURPOSE PLANTS

- 5.1. One of the solutions found, or at least that has started to be attempted, was the utilization of existing workshops and plants more efficiently as well as for multipurpose production to include farm implements production in plants which had their own lines of production other than farm implements. This has been done without additional machinery or very little balancing equipment where this was found necessary.
- 5.2. In addition to farm implements proper, production of some capital goods in these multipurpose plants have also been successfully carried out.
- 5.3. As a first step in achieving this the Ministry of Industries started to organize a series of meetings with public manufacturers of farm implements as well as with other metal working industries represented by their association, called Metals Engineering Industries Development Association (MEIDA). Experts from the Ministry of Agriculture were also invited as well as engineers from industrial support institutions such as the Tanzania Engineering and Manufacturing Organisation (TEMO) and The Centre for Agricultural Mechanization and Rural Technology (CAMARTEC). At first these meetings were chaired by the Minister himself to give the issue the importance required to arrive at a solution quickly.

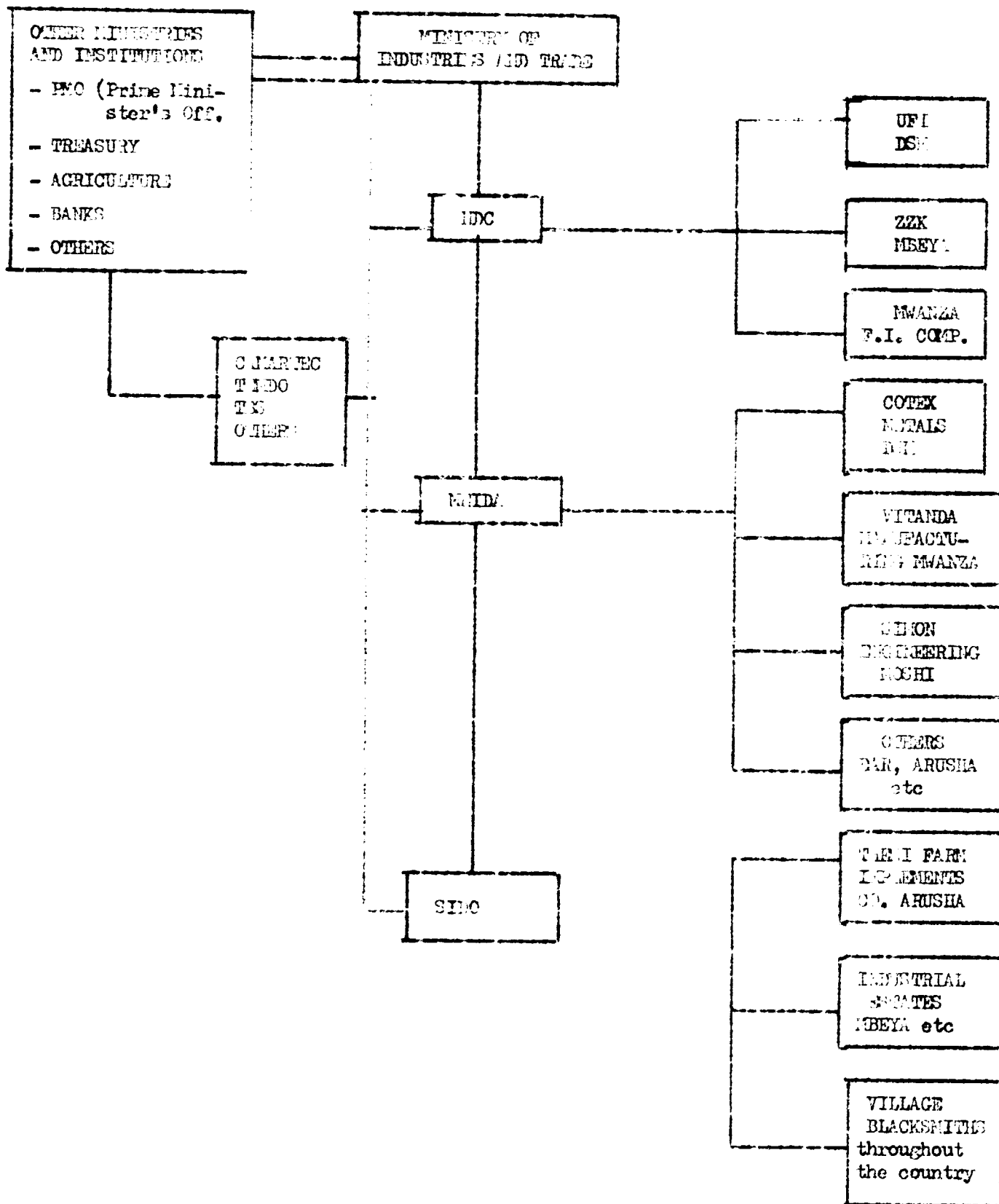
5.4. These efforts started to bear good results. Most of the problems listed in section 3 above started to be resolved.

6.0. ORGANISATIONAL STRUCTURE FOR MULTIPURPOSE PRODUCTION

6.1. Coordination at the national level was improved utilising a structure represented by the following diagram.

6.2. On top we have the Ministry of Industries and Trade coordinating the different parties involved. On the right there are the manufacturers which are in three main levels. Those under NDC (National Development Corporation) which are specifically set up for farm implements manufacturing. (UPI is also responsible for importation of finished implements). Then there are those under the umbrella of MEIDA (but not owned by the association) which were set up with other lines of production but have added farm implements manufacturing to utilise extra capacity with no or very little added machinery. On the left we have other ministries and institutions concern in one way or another with achieving the objective. These include the Ministry of Agriculture, the Treasury and the Bank of Tanzania (BOT) as well as the National Bank of Commerce (NBC). The role of the Ministry of Industries and Trade is to inform these institutions and urge them render the necessary timely support. If necessary the issue can be taken up to the cabinet by the ministry.

STRUCTURE OF FARM IMPLEMENTS MANUFACTURING IN
TANZANIA (OCT 1984)



- 6.3. The role of MEIDA is to find among its members companies that are able to take up a particular product for manufacturing and provide the necessary assistance which MEIDA may obtain from the government or other institutions including institutions abroad. The small Industries Development Organization (SIDO) does the same thing to small scale industries and village blacksmiths who may require better hand tools and support to obtain steel scrap. TEMDO and CAMARTEC are complementary with regard to design and prototype development. In addition CAMARTEC undertakes field tests of the implements manufactured locally or those required to be imported.
- 6.4. TEMDO was, for example, able to develop a method for utilising discarded railway sleepers for the manufacturing of plough shares. With regard to CAMARTEC, Appendix A is attached showing a text report on matches manufactured by Cotex Metals through the assistance of MEIDA which obtained the services of a Swedish expatriate design engineer employed by the Ministry of Industries as part of SIDA's support to the government with regard to farm manufacturing in multipurpose plants.
- 6.5. Appendix 1 shows the overall plan for manufacturing and importation of farm implements this year. The plan gives the agreed national demand for the various items, targets for production by each company or group, and amounts to be imported (by UFI) to fill the gap. The plan was formulated after consultations with all the institutions and manufacturing plants. Each manufacturer then computed the foreign exchange required.

7.0. ACHIEVEMENTS

7.1. Following these efforts by the government and with full cooperation of industry several achievements were recorded. The two major results were that firstly it was possible for the first time in five years to satisfy the demand for hand and animal drawn farm implements in the country. Although some manufacturers could not meet their targets as it will be explained later the major producer, UFI, was able to achieve production above the nominal plant capacity.

7.2. Table IV shows the set production plans and actual achievements for 1984.

TABLE IV

PRODUCTION PERFORMANCE OF FARM IMPLEMENTS MANUFACTURERS
IN 1984

COMPANY	PLANNED PRODUCTION (1984)	ACTUAL PRODUCTION (1984)	PERCENTAGE
UFI	Hoes 1,660,000	2,175,216	131%
	Ploughs 20,000	24,614	123%
	Shares 200,000	229,886	115%
ZZK	Hoes 250,000	90,982	36%
	Ploughs 15,000	976	6.5%
SIDO	Hoes 50,000 and 60,000	32,176	64%
	Ploughs 5,000	2,674	53.5%
	Shares 40,000	22,184	41.6/55.5
MUDA	Hoes 250,000	30,000	12%
	Matchets 256,000	160,000	64%
	Ploughs 5,000	518	10.4%

7.3. Achievement of UFI

It will be noted from Table IV that for all the products UFI was able to achieve more than 100% of the planned targets. This good performance which has been achieved for the first time can be attributed to two major factors. The first is the change in top management. The new General Manager brought in at the end of 1983 introduced incentive system and more close supervision and constant follow up. This brought good morale to the workers and quick solution to production bottlenecks. The second reason for the good performance by UFI is the strong support received from the government and financial institutions which enabled UFI to obtain the foreign exchange required.

7.4. It can be seen that for 1984 UFI success has been in two main products namely the animal drawn plough and the hand hoe. However it can be stated that the experience gained so far and given continued government's support other products such as spade, axe, machet and even walking tractor employing imported diesel engine may be manufactured on the same machinery with perhaps one or two additional balancing machines. The idea of multipurpose production will then be enhanced.

7.5. Achievements by MEIDA Members

7.5.1. So far seven companies who are all members of MEIDA have started the production of ploughs and hand farm implements

under the initiation and technical support of this association. Vitanda Engineering Company of Mwanza produced more than 300 ploughs in 1984 using the Liljevik design which employs a wooden beam. It was noted however that the Company started to experience marketing problems when UPI ploughs arrived for sale in the same area. Farmers preferred to buy UPI ploughs because they are used to them. Since some of the UPI ploughs were imported it is clear that there is a need to protect local producers such as Vitanda Engineering to protect them from competition of this nature in order to enable them to diversify into multipurpose production. Originally the company was set up to produce metal furniture and general engineering fabrications. Production of ploughs started only in 1984 in order to utilize the spare capacity and at the same time assist the country in solving the problems of shortage of farm implements. All the drawings and production technology was supplied free of charge by MFIDY. The Company designed and made their own tooling for the job which may be said to be the only additional investments.

- 7.6. Rajesh Engineering and Rehmanji of Dar es Salaam and Hanspal Singh of Arusha embarked on the production of spades. Initially they used the tail ends from the cold rolling mill of Aluminium Africa Company in Dar es Salaam. However these were found to be rather soft and so better material was imported for later production. They developed their own toolings including hand fly press (Rajesh) and hydraulic press (Hanspal Singh). As a result of these efforts

which had full support of NEIDA and the government their Companies have now been able to add another line of production in their otherwise general maintenance and fabrication shops.

The government, through the ministry of Industries and Trade, has been so much encouraged by these efforts that it has already advised against further importation of spades of the types manufactured by these companies. This step is of absolute importance because local producers will not be able to compete against cheap imported products.

7.5.3. Cotex Metals of Bar es Balcon which was set up as a general purpose machine shop and tool room took up the production of straight pangas (machetes). The design of the blade and production technology was provided by Mr. Liljevik while the special press and grinding tools were manufactured by Sandvik of Sweden on the designs of Mr. Liljevik. During 1984 which is the first year of production 160,000 pangas have been produced. However two problems have been faced with by Cotex. The first concerns quality. The test reports from CAMARTEC indicated some defects in connection with the blade and the handle. These are now being rectified by using thicker blade, harder wood and better rivets for the handle. The second concerned problem of selling due to the low price allowed by the price commissioner. This has now been solved by allowing a slight increase in the price. Thus production which had been suspended has now resumed. In general this

this has been a good success although MEIDA had to assist the Company in the procurement and commissioning of surface grinding machine for grinding the tools. Simple woodworking milling heads were also added to a subcontractor for the handles to cope with the large quantities involved.

The greatest lesson that can be learnt here in terms of introducing production in multipurpose plants is that it is often necessary to obtain the assistance of specialised expertise in the initial stages in order to reduce research and development cost and time. Also it may be necessary to invest in a few additional machinery to achieve higher production and productivity.

7.5.4. Simon Engineering in Moshi is another member of MEIDA which has taken up the production of farm implements. It started to produce hoes at the initiation and encouragement of MEIDA. They subcontract the work of heat treatment of the hoes to another company based at the SIDO industrial estate in Moshi. The hoes are sold through their own marketing channels. But the company has recently been faced with the problem of competition from UFI which is well established and specialised in this field. UFI also imports additional hoes to fill the gap left by local manufacturers. However, it has not been easy to forecast the demand pattern and therefore set importation targets which does not affect local production.

7.6. Achievement of Mbeya Farm Implements Company (ZMI)

The performance of Zana za Kilimo Mbeya (ZMI) during its first year of production was very poor. Only 36% of the planned production of hoes (90,982 against 250,000) and only 6.5% of the ploughs (976 against 15,000) was achieved. Two major factors can be attributed to this dismal performance. The first is poor and inexperienced management and the second is lack of technical personnel. These problems led to the production of ploughs using Liljevik design of the shape and sizes but substituting the wooden beam with a metal beam. This made the whole structure too heavy and too costly. The hoes were also similarly produced in such a manner that 50% of the material is wasted. Thus making the hoes too expensive. It has now been decided to suspend production of both items until a new management and technical team takes over. It is expected that the team will come from a Swedish Company under the assistance of SIDA. In some respects the machinery at Mbeya, which are still new, are better than those at UPE. It is therefore clear that good management and experienced technical personnel are key factors that determines success or failure in the production of farm implements or other capital goods in multipurpose plants.

7.7. Achievement of SIDO Supported Companies

7.8.1. A company that receives the support of SIDO which has done well in the production of farm implements is Theml Farm Implements Company in Arusha. This Company was established some three year ago with the assistance of United States of America (USID) under the Arusha regional authority.

It is now producing ox-carts of CAMAREEC design, ploughs wheelbarrows and oil presses of Institute of Production Innovation (IPI) design. About 2,000 ploughs were produced in 1984 and sold to various regions with the majority going to Arusha region. The Company is under the full management of local personnel of whom no less than four are graduate engineers. Its success may be attributed to the assistance of UNID especially in providing raw materials and the initial expatriate personnel. The second factor is the early recruitment of dedicated and motivated local engineers. Again it is an experience which clearly indicates the importance of competent technical personnel if production in multipurpose plants is to succeed.

7.8.2. To a lesser extent other small and cottage industries supported by SIDA did contribute in the production of hand farm implements. However, most of these may not fall under multipurpose plants proper. It is nonetheless important to conclude that some coordinating mechanism (in this case SIDA) is necessary for success even at this low level of production. For SIDA did provide some logistic support and institutional contacts which enabled the plants to achieve what they did.

7.9. Achievement of TENDO

7.9.1. The Tanzania Engineering and Manufacturing Design Organisation (TENDO) has also played an important function in promoting multipurpose production. It has designed several products which are now at different stages of development as indicated

in Appendix II TEMDO has on its staff five engineers, two of whom have undergone training at the African Regional Centre for Engineering Design and Manufacturing (ARCEDEM). There is no doubt that the short courses conducted by ARCEDEM in Ibadan, Nigeria has helped to sharpen the design abilities of young engineers concerned. Two major problems have however faced TEMDO. One is the problem of who is to bear the cost of development work. It has been difficult to identify manufacturers willing to financially support engineering development work especially given the present scarcity of raw materials and bought out items such as bearings. In some cases TEMDO has paid for major part of the cost and in others some sharing arrangement has been agreed with the manufacturer. The second problem is the lack of drawing and reference facilities at TEMDO not to mention the problem of shortage of experienced design engineers. All the five desk design engineers have less than three years experience. Had they had the benefit of working with experienced design engineers they would have matured and gained confidence faster. It is in this area that the assistance of organisations such as ARCEDEM and UNIDO is very much called for. Assistance given to national design centres such as TEMDO will multiply and trickle down to the operating companies. In this way plants may be able to produce a number of implements and capital goods. Thus making them truly multipurpose plants.

7.9. Other Potential multipurpose plants

are

7.9.1. In addition to the above companies there ~~are~~ many other plants in Tanzania which could manufacture on a multipurpose model.

7.9.1. Among them there are three which must be mentioned because they offer great potential. The first Mang'ula Mechanical and Machine Tools Company. This was originally set up as a repair workshop for the construction of the Tanzania - Zambia Railways by the Chinese. It was taken over by the National Development Corporation (NDC) in 1977. Since then it is being turned into a multipurpose production plant. It is already making centrifugal water pumps, coffee pulpers, grain grinding mills, vehicle spare parts, as well as many other spares on order. It requires strengthening of its design and development capabilities and the training of its technical as well as managerial manpower and an improvement of its foundry. The second company which is more or less on similar lines to Mang'ula is the National Engineering Company which is also publically owned through the N.D.C. The third company which is 100% private is the d.m Investment Company in Mwanza. It has modern machines and also a ferrous and non ferrous foundry. It is producing some wood working machines, air compressors, electric cookers refrigerators as well as grain processing mills and spare parts. With concerted planning, coordination and cooperation these companies have the potential to produce a number of

agricultural machinery and capital goods such as tractors, diesel engines, electric motors and small hydraulic power generators.

6. PROBLEMS AND CONSTRAINTS

6.1. From Tanzania's experience of 1984 as explained above it can be said that among the problems and constraints to be faced by developing countries involved in production in multipurpose plants are the following. The first is technical problems in regard to design and development capability as well as quality and cost effective production. Multipurpose plants must have experienced engineers and technicians especially in toolmaking and foundry so as to cope with the flexible production necessary. The second problem is one of marketing. Here the issue may be one of price or it may be the lack of knowledge of the new products by the customers especially farmers who may be used to some imported makes and find it difficult to change to the new local designs. The third problems the solution of which is perhaps the most important is one of national policy on the whole issue of multipurpose production. By corollary such production means less specialisation which generally means higher production costs due to the more frequent changes in the tooling, quality control procedures and raw material purchase plans. Thus without a clear government support which should also include tax exemption incentives and restricted importation of foreign competing products multipurpose plants might not survive for long.

9. CONCLUSION AND RECOMMENDATIONS

9.1. From our experience it can be concluded that multipurpose plants are feasible given certain conditions. Among these conditions are clear government support, experienced manpower both at managerial and technical level, and a carefully worked out marketing strategy. It can therefore be recommended the following measures should be taken at the company level, the national level and international level.

9.2. At the company level

Recruitment and training of good managers and technical personnel must be carried out at the earliest stage. Secondly production should start with only a few range of products that can be manageable and whose local market exist. Such market should be retained and increased through proper information and education at all levels and through constant follow up with the end users as well as the government machinery so as to influence the government take the required policy measures.

9.3. At the national level

first step should be to carry out a national study to identify a few plants and products which can be promoted or chaged into multipurpose production. Once the companies are identified their specific requirements should then be known and measures should be taken to provide them. It will be found out that such measures will lead into making policy delibury specially as regards to fiscal

policies and in some countries pricing policy. At the national it will also be necessary to put the potential manufacturing plants in contact with international organisations such as UNIDO. It might be necessary for government machinery to facilitate assistance from such organisations to the plants by making the official requests. The national machinery must identify the focal point or ministry which will then be charged with the necessary coordinating role.

9.4. At the international level

Organisations such as UNIDO should promote multipurpose plants in the developing countries through provision of experts, training fellowships and organisation of seminars and workshops. In many instances it might be necessary for diagnostic missions to be sent to requesting countries in order to work out programmes with the concerned countries and the specific plants so that smooth implementation may be effected.

9.5. In conclusion the author believes that when and if proper measures are taken by the plants themselves, the nation concerned and the international community along the lines enumerated above it will be possible to produce agricultural implements and capital goods in multipurpose plants. This however should not imply that specialization and single purpose plants are not feasible or necessary.

FARM IMPLEMENTS DEMAND AND SUPPLY PATTERN (1984)

I T E M	NATIONAL DEMAND 1984 PCS	LOCAL PLANNED PRODUCTION FOR 1984 PCS				
		U F I	Z Z K	MEIDA	SIDO	TOTAL
1. HOES	3,700,000	1,060,134	250,000	250,000	50,000	2,210,000
2. MACHETES	1,200,000	NIL	NIL	250,000	NIL	250,000
3. AXE	264,000	NIL	36,000	NIL	NIL	36,900
4. SHOVELS	690,000	NIL	58,000	300,000	NIL	358,000
5. PRUNING SHEARS	40,000	NIL	NIL	NIL	50,000	50,000
6. PLOUGHS	100,000	20,000	15,000	5,000	5,000	45,000
7. SICKLES	300,000	NIL	NIL	NIL	NIL	NIL
8. SPRAYERS	104,000	NIL	NIL	NIL	NIL	NIL
9. G. SLASHERS	70,000	NIL	NIL	NIL	70,000	70,000
10. RAKES	70,000	NIL	NIL	NIL	70,000	70,000
11. HARROWS	680	NIL	NIL	NIL	680	680
12. RIDGES	680	NIL	NIL	NIL	NIL	NIL
13. CULTIVATORS	300	NIL	NIL	NIL	NIL	NIL
14. PLANTERS	300	NIL	NIL	NIL	NIL	NIL
15. WEEDER	300	NIL	NIL	NIL	NIL	NIL
16. PLOUGH SHARES	350,000	200,000	NIL	NIL	40,000	240,000
17. DRAG WHEELS	60,000	12,000	NIL	15,000	NIL	27,000
18. TREE CHAIRS	300,000	NIL	NIL	NIL	NIL	NIL
19. FROCK	75,000	20,000	NIL	NIL	NIL	20,000
20. FOULD BOARDS	75,000	NIL	NIL	NIL	NIL	NIL
21. CAME/SIGNAL KNIVES	300,000	NIL	NIL	NIL	NIL	NIL
22. BOLTS AND NUTS AND OTHER	2,000,000	106,000	1,500	NIL	2,000	109,500

N.B. The demand/supply gap is to be filled by available stocks and importation.

TANZANIA ENGINEERING AND MANUFACTURING DESIGN ORGANIZATION

PROGRESS REPORT ON PROTOTYPES DEVELOPMENT

PROTOTYPE/PROJECT	PROJECT STAFF	PROTOTYPE MANUFACTURER	ACTIVITY	1984 MONTHS						1985		REMARKS	
				10	11	12	1	2	3	4	5		6
1. Single Operation Manual Thresher (Assembling of five Prototypes)	Kwakyalika, B.R.	Meru Wood Products ARUSHA.	Design/Adaptation										These 5 No. threshers will be sold to rice growing regions for demonstration, popularisation.
			Manufacture	=====									
			Testing				=====						
			Market Promotion							=====			
2. Manual Fly Press.	Koshima, K.P.R.	SIDO-Common Facility Workshop. Arusha	Design/Adaptation	=====									
			Manufacture	=====									
			Testing				=====						
			Market Promotion							=====			
3. Irrigation Pump (Powered)	Shelumwari S.S.	National Engineering Co. Limited	Design/Adaptation										Assembly work to be finished by end of January, 1985
			Manufacture	=====									
			Testing				=====						
			Market Promotion							=====			

1. The first part of the document discusses the importance of maintaining accurate records of all transactions. This is essential for ensuring the integrity of the financial statements and for providing a clear audit trail.

2. The second part of the document outlines the various methods used to collect and analyze data. These methods include direct observation, interviews, and the use of statistical models. Each method has its own strengths and limitations, and it is important to choose the most appropriate one for the specific research question.

3. The third part of the document discusses the ethical considerations that must be taken into account when conducting research. This includes issues such as informed consent, confidentiality, and the potential for harm to participants.

4. The fourth part of the document provides a detailed description of the data collection process. This includes information about the sample size, the data collection instruments used, and the procedures for ensuring the reliability and validity of the data.

5. The fifth part of the document discusses the results of the data analysis. This includes a summary of the key findings and a discussion of their implications for the research field.

6. The sixth part of the document provides a conclusion and a list of references. The conclusion summarizes the main points of the document and provides a final thought on the research. The references list the sources of information used in the document.

