



**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)

08846

Distr.  
LIMITED  
ID/WG. 282/67  
6 October 1978  
ENGLISH



UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION

---

# INTERNATIONAL FORUM ON APPROPRIATE INDUSTRIAL TECHNOLOGY

New Delhi/Anand, India 20-30 November 1978

.....

**WORKING GROUP No.8**

**APPROPRIATE TECHNOLOGY  
FOR LIGHT ENGINEERING INDUSTRIES  
AND RURAL WORKSHOPS**

.....

**ESTABLISHMENT OF SMALL-SCALE RURAL WORKSHOPS  
(FOR LIGHT ENGINEERING GOODS) IN EAST AFRICA**

**Background Paper**

ESTABLISHMENT OF SMALL-SCALE RURAL WORKSHOPS  
(FOR LIGHT ENGINEERING GOODS)  
IN EAST AFRICA

by

A. Hojbak  
UNIDO consultant

The description and classification of countries and territories in this document and the arrangement of the material do not imply the expression of any opinion whatsoever on the part of the secretariat of 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 regarding its economic system or degree of development.

The views and opinions expressed in this document are those of the author(s) and do not necessarily reflect the views of the secretariat of UNIDO.

Mention of firm names and commercial products does not imply the endorsement of the secretariat of UNIDO.

The document is reproduced in the form in which it was received and it has not been formally edited.

CONTENTS.

	Page
Introduction	1
The concept	2
The political determinator	3
The historical background	4
What are the rural needs?	6
Large scale production	9
Medium scale production	11
The UTUNDU PROGRAMME	15
Identification of groups	16
Selection of groups	17
Products	17
Raw material supply	23
Technical extension service	23
Marketing	24
The FISHERY PROJECT	25
The SISTER INDUSTRIES	33
The overall strategy	36
Policy incentives	42
Summary and conclusions	43

Introduction.

The Lima Declaration and Plan of Action envisages that at least 25 per cent of world industrial production should originate in developing countries by the year 2000.

How can these intentions be implemented and what are the consequences for the developing countries if it happens?

For obvious reasons the preconditions for such an enormous industrial output is a tremendous expansion of the so-called modern sector in the developing countries. A consequence of such expansion is a lot of social problems caused by dualism in society, migration from rural areas of the productive forces, slums in metropolitan areas, etc.

The scarcity of capital severely limits the number of nonfarm jobs that can be created because investment costs are high in modern industry.

An effective development policy should seek to increase the use of labour relative to capital - to the extent that it is economically efficient. Thus to give a balanced development in any society it is necessary to direct part of the economic activities to the "informal sector".

This paper is not pretending to give the answer to the question whether the developing countries are in a position to live up to the intentions of the Lima Declaration or whether this is most efficiently done in the modern, urban industry or in a modernized rural industrial set-up.

It is implicitly indicated that the conditions in the developing countries need a two-fold approach as to industrial development, i.e. a "modern sector" based on urban/export markets and an "informal sector" based on the rural/local needs.

Obviously a lot of industrial products need no consideration of being produced in the "informal sector" in the rural areas. However - light engineering is an obvious issue for small workshops in the rural areas of any developing country - especially if it be directed towards production of "means of production", e.g. agricultural implements, tools etc.

This paper is dealing with the conditions in the "informal sector" primarily exemplified by present conditions in the East African region. The paper will concentrate on three case studies which are typically "good" projects seen from an overall point of view. Those projects are:

1. The UTUNDU programme - a programme specifically designed to promote the village blacksmiths of Tanzania who are representing a strategic productive force in the Tanzanian development programme.
2. The FISHERY programme - a soft technology solution to an integrated small scale fishery set-up for tropical coastal societies.
3. The SISTER INDUSTRIES agreement - a programme whereby know-how, technology, management etc. from an industry in an industrialized country is transferred to a similar industry in a developing country through a special agreement.

#### The concept.

What is the concept of appropriate technology in small scale rural manufacturing units in a given country? According to UNIDO 1) - "the appropriateness of any technology will be determined by the conditions prevailing in a given country and its selection will be governed by the criteria to be applied." -

Also - "appropriate technology is technology that contributes the most to the economic and social objectives of development." -

An obvious question then would be - what are the conditions prevailing in the society in question and what is the expressed development strategy of that country?

If we can identify and analyze these questions we may as well be able to derive an answer to what technology is appropriate under certain conditions.

---

1) UNIDO: Co-operative programme of action on appropriate industrial technology. Report by Executive Director. ID/B/188. 14 April 1977.

The political determinator.

If appropriate technology for small scale industrial development are to have the necessary level of government support, then there must be the political will and committment, not only at the top, but through to the middle and lower ranks of government to want to create a more even distribution of income and wealth. Probably very few countries really have this and this is one of the key reasons why appropriate technology have received so little attention with very limited action.

The importance of small scale industries in national development may be expressed no better than by directives 1) from the National Executive Committee of the Party of Tanzania:

"Small scale industries are necessary for our country's development because a country like our has been oppressed and exploited for many years, does not have much sophisticated know-how and capital. Since small scale industries do not need sophisticated know-how and much capital they can be started and run by the peoples themselves, especially if they do so on a socialist basis.

Many of our ujamaa and other villages at present have only one or two occupations - farming and livestock keeping. Because our farming depends so much on the rainy season, many peasants work only for a short period every year. Small scale industries started in the villages will give our people a chance to do productive work throughout the year.

At present we are facing a problem of increasing unemployment in both industries and offices. The establishment of many small scale industries in rural and urban areas will enable many more people to engage themselves in productive activities.

One important objective of our rural socialism is to bring about a technological revolution in the rural areas. Small scale industries will play an important role in achieving this aim, in the same way "politics is agriculture" does in relation to agricultural technology.

---

1) Directive from the National Executive Committee on the establishment and development of small scale industries in Tanzania.



Moreover, small scale industries are essential in the implementation of our policy of self-reliance, starting from the family, ujamaa village, through to the nation and also in eliminating step by step the disparities which now exist between rural and urban conditions.

In addition to these fundamental advantages, if ancillary and other small industries are developed systematically the cost of industrial production will be reduced."

So far the political intentions of Tanzania.

#### The historical background.

Let's have a short look at the historical background for the industrial situation in East Africa. This will give us an idea of the situation right now and what efforts may be needed to establish a strategy for further development.

The economy of East Africa at independence - as in other former colonies - is structured according to the historical pattern brought about by colonial and imperial domination. The colonial system had a great influence on the structure of production, distribution of income and population, and the contribution and character of foreign trade.

The colonial system in East Africa is generally agreed to have had several major economic objectives - apart from more political and strategic objectives.

Before the colonial era production facilities existed for satisfaction of the primary needs of the people to grow food, protect the body and defend the territory.

In the colonial period the existing - however primitive - small industries languished caused by the competition in the beginning of this century from cheap mass produced goods from Europe.

The colonial powers established a primary production based on local raw materials and the existence of cheap labour. Also establishment of infrastructural facilities - roads, railways etc. - for transport of products to the coast as well as for spares etc. to the production plants was a result of the colonialism.

That's the reason why most industrial plants at present are to be found in Nairobi, Mombasa or Dar es Salaam.

There was quite a lot of activities going on in East Africa in the nineteenth century. Iron smelting and production of iron implements including wire drawing, cotton cloth spinning and weaving, pottery, basket and mat weaving as well as leather tanning was established.

Pottery and basketweaving have tended to survive better than other crafts. This is first of all because pottery is more durable than alternatives, e. g. aluminium, has certain properties such as suitability for storage of water, and imparts a flavour to food.

According to Helge Kjekshus 1) German travellers described villages of southern Unyamwezi in the 19th century as "industrial centres" exhibiting skills comparable with those of parts of pre-industrialized Germany.

Iron smelting and blacksmithy was well established among the North Para people, the Masai and the Rongo. During the early 19th century iron tools, ornaments and weapons were being adopted throughout the region replacing ebony wood and other materials. Iron ore was excavated at Malenda and Kilwa, and the most important production centres were Karagwe, Uha, Uzinza Kahama south eastwards to Ufipa. Rudimentary blast furnaces were in use in these areas using wood charcoal and limestone flux. In Kilimanjaro blacksmiths using locally made equipment produced wire for manufacture of chain links.

At the beginning of the 20th century these trades were dying due to competition from mass produced European iron implements, despite the fact that in some places local iron ore was regarded as of superior quality. Kjekshus in the above mentioned study quotes travellers reports that by 1937 in Ufipa local iron hoes cost shs. 4,- as against shs. 2,- for the imported variety.

---

1) "Pre-colonial industries - a preliminary survey". University of Dar es Salaam, 1974.

Another traveller - French missionary, Pere Brard - claimed that in 1897 iron hoe production at Uzinza amounted to 30.000 units per annum, while another estimate was made in the 1880's that 150.000 hoes were sold per annum in Tabora market. This figure is approximately equivalent to the present production of hoes at the farm implement factory in Dar es Salaam.

The above examples attest to the fact that craft industry and a relatively integrated rural economy existed in many places in pre-colonial times. There is no doubt that techniques of production were relatively rudimentary and that output per head was low.

In Tanzania iron hoe production disappeared for about 70 years until 1970 when Ubungu Farm Implements, a 200 employee enterprise was established with Chinese collaboration. Initial planned output was 260.000 hoes per annum, probably rather less than was being produced in Tanzania in the 1880's. Furthermore all iron and steel materials are being imported as well as machinery and spare parts. The re-exploitation of Tanzania's reserves of iron ore on a scale adequate for industrial expansion is scheduled for the period after 1980.

#### What are the rural needs.

Still trying to specify the concept of appropriate technology in a particular society we may try and look into what are the needs of the rural areas as to technology for development.

The economic basis for most developing countries is agriculture. Ample supply of farm implements is one of the most important prerequisites for rural development. Craftsmen's tools and simple machinery as well as basic household utensils are very important items for the rural majority of the population.

It may be open for discussion in which segment of the economy those products may most appropriately be produced. Should the production take place in a few centralized units or would it be possible, feasible and appropriate to establish the production in rural workshops?

At present exactly this discussion is going on in Tanzania and we may for clarification take closer look at the situation there:

Jens Müller 1) is saying about the background in Tanzania:

The main historical, geographical and socio-economic features of Tanzania as well as the declared overall policy since 1967 towards socialism and self-reliance we assume are known to the reader.

Tanzania's rural development strategy emphasizes the need to increase agricultural production by mobilizing the productive capacity, and improving the living standards of the 14.0 million people (out of a total population of 15.3 million) estimated to live in the rural areas, almost wholly engaged in subsistence agriculture. About 85% of the country's peasant holdings are below 2 ha.

A particular target for the increased production is set to be self-sufficiency in food production, at least in cereals, by 1980. Apart from improving seeds development, fertilizer distribution, extension and credit services, agro-mechanization development is an important component in the efforts to reach the above mentioned target. At present the ratio between hand-, animal- and tractor-cultivated land belonging to the villages is something like 85-10-5 (%). Both animal- and tractor-powered cultivation are being promoted through expansion of tractor-hire services and ox-training centres in order to change this ratio away from hand-cultivation. However, this change is a slow process. Hand-tools will remain the most important means of production for a considerable time to come. Although no explicit policy statement is made, a demand projection from 1973 contains an implicit policy intimation in that it predicts the relative share of total demand (this demand measured in tonnes) between hand-tools, animal-implements and tractor-equipment to change from 81-11-8 (%) in 1977 to 72-18-10 (%) by 1984. Nevertheless, the total weight of hand-tools demanded annually is projected to increase from approx. 5,600 to 6,600 tonnes over the same period, representing an average annual increase of 2.3 %.

---

1) Jens Müller: "Promotion of rural implement manufacture in Tanzania".  
Centre for Development Research, Copenhagen 1977.

As regards integration of rural non-agricultural production in the rural development strategy the policy position of the government is less clear. This probably has to do with a much felt and debated, yet unsolved, lack of an overall industrial development strategy. What we can observe is that whereas large-scale, state controlled/owned enterprises over the past ten years have grown, the privately owned, registered, medium- and small-scale enterprises have stagnated, in some sectors declined. E.g. in 1968 the enterprises of between 10 - 100 employees accounted for 44 % of gross industrial output and 37 % of employment. In 1971 the levels were 29 % and 23 % respectively. The number of enterprises of over 100 employees did rise from a total of 86 to 120 in the same period. Although no precise survey data of industrial production have been compiled since 1972 we can confidently say that the situation since 1971 has been perpetuated. Enterprises employing less than 100 people are not enumerated comprehensively as yet, and are thus not included in the above figures.

However, in 1973 a special party directive on small industries was issued. It stressed the need for a technological revolution in the rural areas based on control by the people, using existing skills and materials and avoiding heavy capital expenditure. A particular institution, the small Industries Development Organization (SIDO), was created and given the task to formulate and implement a decentralized, small-scale industrial development policy. But without an explicit specification of how such a policy should relate to an overall industrial development strategy, let alone to the rural development strategy, SIDO's task was difficult.

Obviously, in this situation SIDO started out by regarding any small, rural, cooperatively organized enterprise as "good", as long as it did "mobilize the production capacity" in any particular area. Soon though, both budgetary and administrative constraints called for some very hard decisions to be made about which type of industries should be promoted, where and how.

Having presented the most relevant background information in respect of agriculture and industry we need to point out a few, more general aspects of the country's rural development scene: In the early 1970's the government decentralized parts of its decision processes and planning-control. The intention was to achieve a high degree of inte-

gration or co-ordination between the different sectors through planning and implementation at the regional level. The country has 20 regions. Besides a Regional Development Director with a very broad field of responsibility, a number of regional and district planning officers were appointed. Similarly, many of the parastatal service institutions opened regional offices. Among these are SIDO's regional offices, each headed by a Small Industries Promotion Officer (SIPO) and assisted by one technician and one economist. Also the state controlled wholesale distribution system was decentralized by the creation of Regional Trading Corporations (RTC). Finally we need to mention that 1974-75 saw a major movement of most of the relatively scattered rural population into planned villages, called ujamaa or development villages. Some 6,700 such villages are presently in existence.

#### Large scale production.

All large-scale manufactured farm implements were imported until 1970. This year a relatively large-scale factory started its operation, the Ubungu Farm Implement Manufacturing Company (UFI) located in Dar es Salaam. Construction of it was started in 1966 after a government agreement between the Peoples Republic of China and Tanzania for an interest-free loan had been made. The company was incorporated and became a member of the National Development Corporation group of enterprises in 1968. The initial investment was 8.4 mill. Tshs (about 1 mill. US\$), and the number of employees is presently about 250. Although the factory was set up with Chinese expertise, it is now entirely in local hands.

The factory is fitted up to produce a wide range of both hand tools, animal implements, and hand-operated processing equipment, such as jembe (hoes), axes, ox-ploughs and spades; to these, groundnut shellers and winnowers. In other words, the product line is rather multi-purpose and versatile.

So far though, the factory has had problems. Initially it had marketing problems since its products had to be sold through the State Trading Corporation (STC) together with other imported implements. This was solved when STC in 1973 was restructured into Regional Trading Corporations.

By then UFI was given the monopoly on control of importation, production and sales of farm implements. But other problems cropped up such as shortage of raw materials, lack of space in ships to transport them, lack of machine spare parts and occasional water and electricity interruptions. The problems of adapting the local infrastructural conditions to the technology are probably gradually being solved.

The problems are not unique for UFI, they are rather quite common to the establishment of large-scale industries. It should be noted, however, that the cost of the local conditions adaptation rarely are debited these industries, neither directly nor in cost comparisons with alternative technologies.

For the said reasons UFI was not able to utilize its full capacity. On an average yearly basis its jembe production capacity of 800,000 was utilized by about 40 % during its five years of operation. The utilization of its 8,000 ploughs/year capacity has been somewhat higher. A number of axes and groundnut shellers has also been produced. But all in all, capacity utilization has been "below 50 %".

The initial difficulties have not discouraged the company. The jembe production capacity is presently in the process of being more than doubled, i.e. to 2.2 mill/year. Also increased capacity for production of ploughs, axes and pangas (machets) is being considered. This may be taken as an indication of more and more emphasis being given towards mass production of relatively simple products, i.e. towards the import substitution type of production policy.

Moreover, a new factory of about the same size as UFI is planned by NDC to be located in Mbeya (in the southern part of the country, next to the new Tanzania-Zambia railway). The site has been surveyed and trial production might be started in 1979-80. Messrs. Mysore Implements Factory of India has been identified to provide technical collaboration. The investment is of the order of 15 mill. Tshs (about 1.9 mill. US\$) in 1975 prices. About 300 jobs will be created by this plant when it reaches its installed capacity of 2,815 tonnes of hand tools (including 1,000,000 jembes), 730 tonnes of animal drawn implements and 365 tonnes of tractor drawn equipment (mainly disc ploughs and harrows).

The proposed production programme of this new plant also indicates that mass production/import substitution is in the forefront of NDC's policy.

Medium-scale Production.

All registered or formal sector production of farm implements other than the new Mbeya plant and UFI we call medium-scale industries in this context. No hard data exist as yet about the type of rural implement production or the volumen of production which takes place in these industries.

But visits in 1976-77 to a number of general engineering workshops in Dar es Salaam and in 8 regional center towns showed that although the machines and skills for making farm and other rural implements are present, practically no such production takes place.

A few ploughs were made or rather rehabilitated and some wheel barrows were occasionally produced. None of the firms had any plans for organized production for the market either. They were willing to take limited orders, but for years no orders had been made. Nobody saw this as a direct consequence of the UFI control over the market, the explanation given was rather that firms themselves considered their present production of steel furniture, steel doors and windows, hospital equipment etc. as more profitable. They also carried out a substantial amount of odd repair jobs. One exception from this general picture was a firm which had developed a simple maize grinding mill in various sizes. The firms capacity was said to be 30-50 mills/month. However, their production had almost stopped because of difficulties in importing the diesel engines that go with the mills.

Although not based on a comprehensive sample we nevertheless quite confidently can say that a typical, but rough profile of the kind of firm we are trying to describe is as follows: It is privately owned and the owners are of Asian origin. Fixed capital assets are between 50,000-100,000 Tshs (6,000-12,000 US\$). 10% of the machinery is less than 5 years old, 60 % between 5 - 10 years of age, the rest installed more than 10 years ago. The number of permanent workers is 10 - 16, mainly skilled, 2 - 4 of which are of Asian origin.



The annual value of output was almost impossible to get any clear picture of, our best guess is that it might be about 1.5 times the fixed assets. There are about 25 firms of this type in the country.

A particular institution needs to be mentioned in this context, namely the Tanzania Agricultural Machinery Testing Unit (TAMTU), This is Ministry of Agriculture unit, and although it is mainly occupied by testing, adapting and designing farm implements (mainly ox-drawn implements) it also carries out some production for sale. It further has 6 satellites, called Rural Craft Workshops (RCW), in the regions, and these have mainly been concentrating on production so far. As such TAMTU and its RCW's can be counted as a medium-scale enterprise. The total capacity is rated as equivalent to about 400 ox-carts and 150 ox-ploughs per year. Capacity utilization has not yet reached its full though. One RCW visited in May 1977 had 18 ox-carts standing in its yard waiting to be sold. Potential buyers had been identified, but no means of transporting the carts to more remote farmers had been found. The RCW had therefore started making window- and door-frames until the distribution problem had been solved. Another RCW, located in a traditional ox-using area, had raw materials supply and management problems and could not meet the demand of the area for carts and ploughs.

6 new RCW's are planned for the next couple of years. The aim is eventually to have one RCW in each region and to add an oxtraining and demonstration component to all of them. The RCW's are also supposed to provide craftsmen's training and to encourage the creation of village workshops. On the latter point the function of the RCW's is to some extent overlapping that of SIDO. Moreover the RCW's might come in a competing position to similar workshops which SIDO tries to promote in the regions, e.g. to SIDO's industrial estate general engineering workshops, in case careful coordination between SIDO and the RCW's is not made. The competition may not be as much for the market as for the supply of raw materials, especially iron.

The cost of one RCW is about 4.5 mill. Tshs (about 0.5 mill. US\$) of which the workshop equipment and plant accounts for about 1 mill. Tshs. Each RCW is scheduled to employ some 30 persons.

Finally we should mention that SIDO in one of the regions has worked on plans for a medium-scale implement enterprise. Its capacity would be for 260 tonnes of animal drawn implements per year. The investment is of the order of 2.7 mill. Tshs. (0.3 mill US\$) and employment of some 70 people. The enterprise is proposed as part of an IBRD sponsored rural development project for the region in question.

As will be seen from the above the situation in the farm implement supply situation in Tanzania is rather chaotic.

Jens Müller in the above study is showing the demand up till 1980 being more than double of the local production. Even after the proposed new factory in the southern highlands being established around 1980 the supply will be far below the demand.

This fact has brought up the question about satisfying part of the demand of agricultural implements by utilizing existing and potential skills with the rural blacksmiths.

Estimates indicate the existence of at least 10,000 active blacksmiths in Tanzania. Some of these blacksmiths are still actively smelting iron in a way as described by Forbes 1) "Wrought iron is produced under a hand forced draught in a simple pit or hearth. Sometimes the yield is increased by building over a pit a small clay chimney charged with alternate layers of charcoal and ore, the bellows being worked during smelting" --.

However - this method of producing iron is not at all feasible - neither from an economic nor an ecologic point of view.

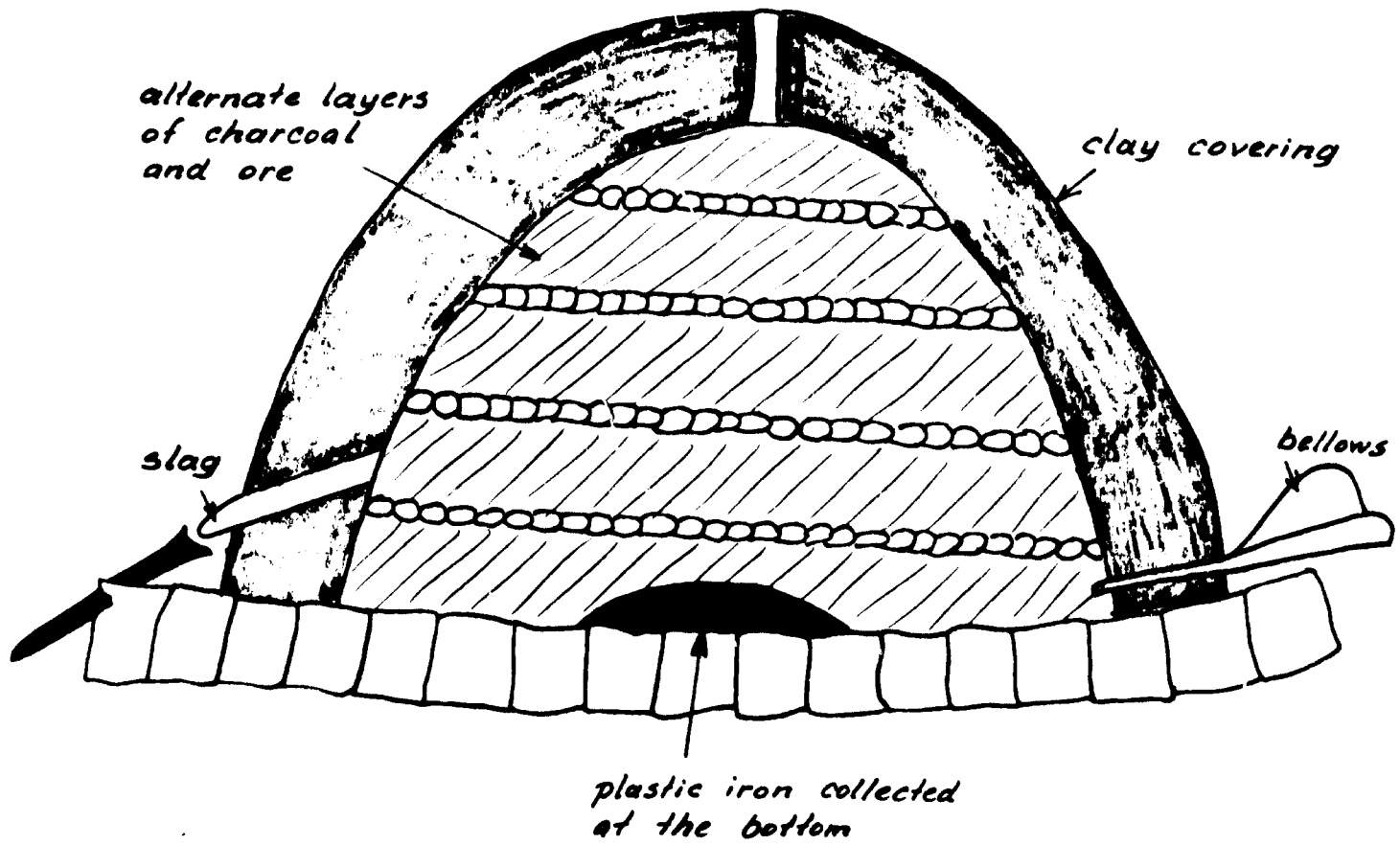
Recent investigations indicate that it requires about 30 man-days to produce one kilo of pig iron and also it takes one ton of wood to prepare the charcoal for production of one kilo of iron. Also the particular type of wood preferred by the smiths they tell is not available any longer.

What could be done to revive the potential productive force of the rural blacksmiths and what has actually been done already?

---

1) R.J. Forbes, Studies in Ancient Technology, Volume VIII

*Bloomery hearth as used  
by the iron smelters of East Africa.*



The matter is a concern of SIDO, the earlier mentioned organization dealing with small industries development in rural areas. SIDO has put a lot of thoughts in the problem and a lot of possible strategies have been discussed. The most promising so far seems to be UTUNDU programme.

The UTUNDU programme.

UTUNDU is the swahili word for "stubborn" in its positive sense of insisting, inventing, innovating, try again.

The aim of the UTUNDU programme is to promote small scale manufacturing and repair of iron and metal items, namely farm implements, tools for other small industries and household utensils.

The programme has two components, namely (A) a product and process development component, and (B) a regional implementation component.

The first component is a SIDO headquarter concern. It consist of documentation and information compilation of new product prototypes and improved iron works techniques. Experiments will be coordinated and subcontracted to local workshops, e.g. to industrial estate general engineering shops sponsored by SIDO. As the district centre and village, UTUNDU-sponsored workshops gradually become consolidated the new products and techniques will eventually be disseminated at a temperate and controlled pace to these, through a moderately expanding technical extension service and skill upgrading programme component.

There are two reasons for the initially modest emphasis on this programme component. It is a time- and resource-demanding thing to carry out experiments, the results of which have to be thoroughly tested before disseminated for widespread application. This is not to say that the component is not important and vital for the programme, and it certainly needs to be initiated. But the modesty also has to do with the pace and nature of implementation of the second component of the programme which we will describe at some length in the following.

The first phase of the second component, the regional implementation component, is designed to consolidate existing black- and tinsmiths' groups rather than to expand them.

IDENTIFICATION OF GROUPS

The first step of the regional implementation component is just a continuation, but intensification of the survey done by the Small Industries Promotion Officers (the SIPO's) and their assistants in all the regions of the country. The survey aims at identifying most, if not all, active smithing groups in the districts.

Whenever an active group is spotted it will be visited and interviewed. As a minimum the following information is obtained and reported:

- a) Precise location of the group (distance to the nearest district centre, type of road etc.), name of the group if any.
- b) Brief description of the most important features of the location (size of the village, available social and economic infrastructure).
- c) Composition and size of the group and description of how it is organized.
- d) Full account of products made; prices.
- e) Count and description of tools in use.
- f) Source and price of raw materials.
- g) Marketing questions.

By the interviewing of the groups, care is taken not to create too optimistic expectation in respect of forthcoming UTUNDU- support. Possible encouragement to organize better may be given, nothing more. Just the formation and registration into co-operative producer groups is a large step to be taken by many of the groups. The act itself of doing so is at places regarded as a sacrifice which then sparks off demands for something in exchange. That the sacrifice is a real one for many should not be underestimated, because being registered requires various fees, tax obligations and sometimes minimum wage demands. And if these costs are not compensated the whole economic basis for the enterprise might disappear.

### SELECTION OF GROUPS

Following the identification survey each group is then categorized into A, B or C workshops according to the chart next page.

This is the first step towards deciding what kind of support the UTUNDU-programme possibly could give the respective groups.

In each case the actual support will be decided upon in consultation with the H.Q. officer in charge of the UTUNDU-programme. This condition is made because this officer will have the overall country covering picture and experience necessary to determine what support is available and best suited in each case.

As a rule of thumb and planning indicator, the following figures will be used for initial selection and spacing of prospective UTUNDU workshops, mainly based on market size considerations:

Group C Workshops: At least a 9,000 families market base required;  
- B - " " 18,000 " " " " ;  
- A - Needs to be determined in each case.

This means, for example, that if a district has 18,000 families (or a population of about 80,000) either two group C workshops or one group B workshop could initially be supported through the programme. Roughly speaking it also means that a maximum of a little more than 300 group C workshops can be supported, or something like 15 per region. As the UTUNDU programme gradually gets successful, and particularly the raw materials supply and the marketing problem gets solved, the 9,000 families per C-workshop planning figure can be decreased. But not before.

### PRODUCTS

Just as the UTUNDU programme builds upon existing skills it also - at least initially - builds upon production of the type of implements which are already being made. The aim is to improve the working processes and the quality. First when a group has shown itself capable of making such improvements, suggestions should be made as to what other items could be made, and what other smithing techniques could be introduced.

Guideline for Categorizing Prospective UFUNDU-Workshops

Characteristics	Group A		Group B		Group C	
	District or regional centre	Rural centre, village or district centre	Village or rural centre			
Location	District or regional centre	Rural centre, village or district centre	Village or rural centre			
Physical set-up	Permanent workshop building with electricity from mains. Comprehensive set of hand tools, some power tools and machinery, welding equipment.	Simple workshop. Hand tools only - mix of traditional and modern. Some hand-operated machines partly/mainly selfmade	Simple workshop. Mainly traditional hand-tools partly/mainly self-made. Few hand-operated machines selfmade.			
Hand-power skills	One or more formally trained in medium level technical and managerial skill, semi- and unskilled workers and apprentices.	One or more informally trained in low level technical skill. Semi- and unskilled workers and apprentices.	One fundi assisted by 1 - 3 relatives (sons), skill inherited mainly.			
Organizational set-up	Partnership or co-op.	Partnership or co-op.	Individual.			
Production	Mainly machinery and tools for other small industry units. Ancillary items.	Agricultural and other implements. Repair of same.	Agricultural and other implements although mainly repair. Traditional weapon.			
Material supply and marketing	Material supply through formal trade channels (RTC) marketing through RTC or to order. Local and national market.	Mainly scrap material. Sales to local market mainly to order.	Only scrap material. Sales to local market, mainly to order.			

It is therefore to begin with not necessary to specify the type of products the workshops should make. The smiths know that already. Moreover it would at present be an impossible task to specify all the products, and what is useful to make in Karagwe District is not necessarily useful in Tunduru District.

However, examples of products are listed below and grouped according to category of workshop which possible could make them.

1. Products suggested suitable for group C workshops:

<u>Farm implements:</u>	Jembes (of various types, kinds and shapes); axes (choppers); bill hooks (local design); adzes; pangas; cutting knives (cane & sisal); sickles; slashers;
<u>Household utensils:</u>	knives; scissors; frying pans; charcoal stoves; kerosene lamps.

2. Products suggested suitable for group B workshops:

All the group C items plus:

buckets;  
water cans;  
dust bins;  
chicken feeders;  
garden shears;  
repair of bicycles and similar repair  
work, e.g. repair of water installations.



3. Products suggested suitable for group A workshops:

Group B products, plus:

Farm Implements:

axes, round eye;  
groundnut shellers;  
maize shellers;  
groundnut lifters;  
hand-operated sprayers;  
planters (hand-opr.);  
wheel barrows;  
ox-carts;  
hand-carts;  
assembling and repair of ploughs.

Tools for small industries:

(including tools used by group C and B workshops)

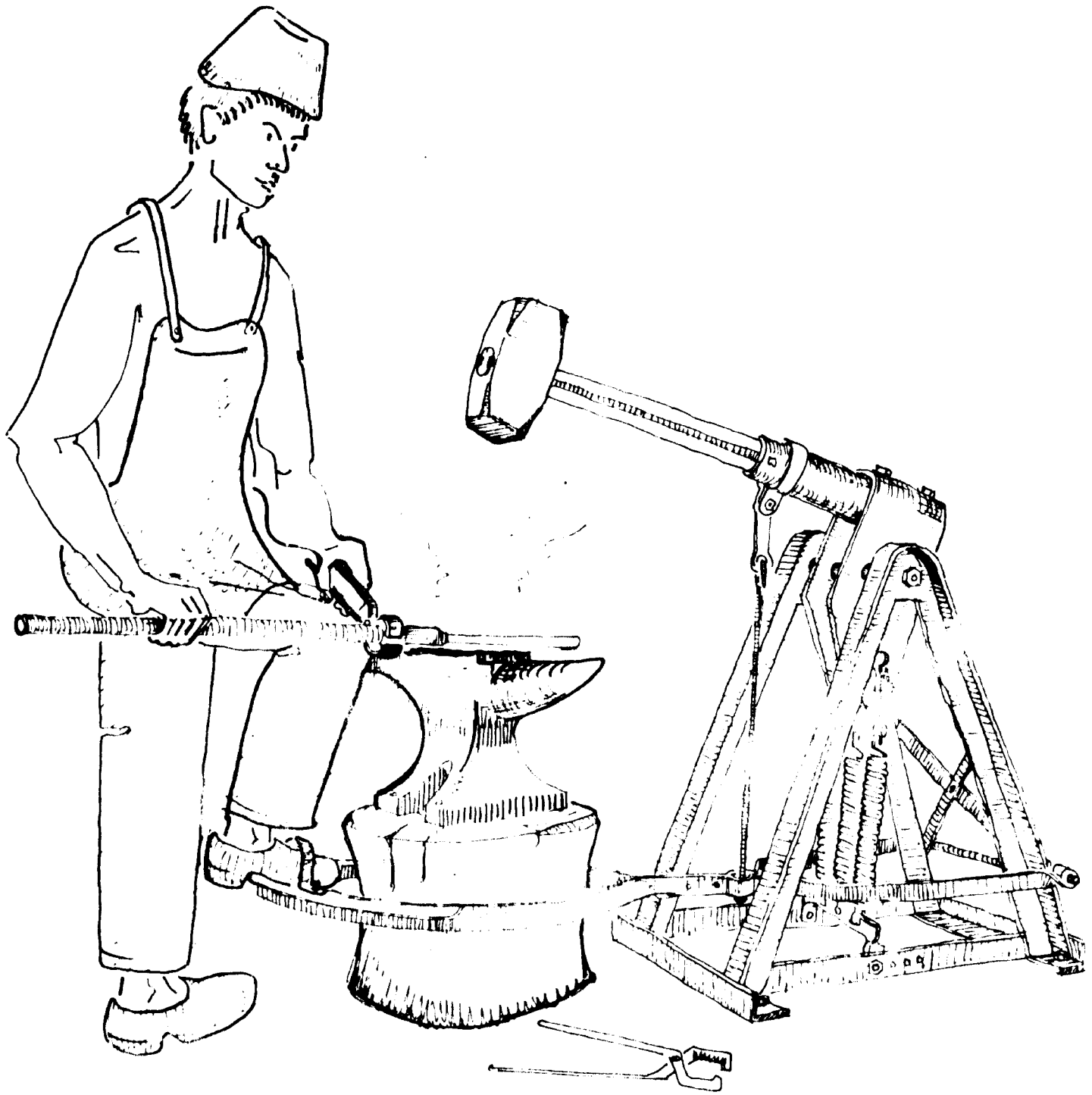
forging hammers;  
pedal operated air blowers;  
holding tongs;  
chissels;  
planer blades;  
sheet metal corrugating machines;  
sheet metal cutting scissors;  
soldering rods.

TOOLS AND EQUIPMENT FOR THE GROUPS

This is one of the crucial points where the UTUNDU-programme can be of direct assistance. Two things are seriously preventing the smiths to expand and improve their production:

1. Lack of tools in the regions
2. Lack of funds to buy the tools

The former points is perhaps the most serious drawback, because even if the smiths have the money they can't buy the necessary tools anywhere. So simply by arranging the tools available for sale at the respective RTC's, SIDO can bring these smiths considerable support.



*Pedal operated forging hammer  
which may be produced by small  
industries and utilized by the  
UTUNDU workshops*

The latter point is also a general problem and hire purchase, soft loans or subsidized prices will be arranged. A SIDO policy decision will be made and communicated to the regions shortly, together with detailed instructions on the necessary administrative procedures. The UTUNDU-programme does not provide for free gift tools. This principle applies for working sheds as well.

Tools recommended for a model group C workshop:

anvil on wooden trunk (50 kg);  
foot-operated air blower;  
various sizes of forging hammers;  
holding tongs;  
files;  
Hacksaw with blades;  
medium size vice;  
chisels.

Tools recommended for a model group B workshop:

All the group C tools plus:

hand-operated grinding stone and drill,  
with set of drills;  
water pipe die machine (hand-operated);  
soldering tools;  
fastening tools;  
metal grooving machine;  
hand-operated metal cutting machine.

Tools recommended for group A workshops:

Each case needs to be considered seperately, e.g. depending on the available electricity supply. But the following seems reasonable to aim at:

Basic blacksmith and machine shop tools;  
Arc welding set (100 - 200 mps);  
Gas welding and cutting torch set;  
Table drilling machine (up to 1" die);

Table grinding machine (two wheels);  
Die and tap set (1 mm to 20 mm);

#### RAW MATERIAL SUPPLY

In many regions the supply of raw materials is absolutely the most serious problem for the expansion of the smiths' production. Thus this must probably be the first thing to consider, i.e. before the supply of tools. At present most smiths rely on collecting whatever scrap material they can get hold of, often buying it at something like 2 shs/kg excluding their bus fares and other travelling expenses.

A first step of assistance will be to arrange a systematic search in the region for scrap e.g. in the garage yards of the various ministries. SIDO is investigating the possibility of making a general arrangement with all regional engineers which can make the handing over procedures of scrap to the UTUNDU-workshops smooth. Secondly, SIDO is negotiating with UFI in order to buy scraps at various qualities from there.

Thirdly, it is being considered that UFI will sell semi-finished blanks of various specific steel qualities, shapes and sizes. These will be distributed through the RTC or directly through the regional SIDO officers.

Particularly the third point might prove to take long time to implement. Regions should therefore be prepared to exploit the first and second possibility fully first. As a rule SIDO cannot commit itself to carry out the actual material deliveries.

#### TECHNICAL EXTENSION SERVICE

Initially no specific technical advice is foreseen. At some later stage, e.g. when the semi-finished UFI blanks are distributed, technical extension service might be needed. Also when the product and processes development UTUNDU-programme component gets results to disseminate, this will go together with extension advice.

MARKETING

This final point is of course of utmost importance. In the initial stage of consolidating the existing groups' reliance on the existing very local market is necessary and believed to be sufficient, e.g. where smiths are claiming that the raw materials supply is their main problem, this has been found to be a sign of excess demand for their products.

It is when improved tools are introduced that care must be taken that a market survey is made. To give a group a loan or the like means perhaps encouraging too optimistic production volumen. This must absolutely be avoided. Whenever a group aims at producing for a market outside the district, consultations with RTC need to be made in advance. RTC generally makes it a condition for handling products that these are higly standardized.

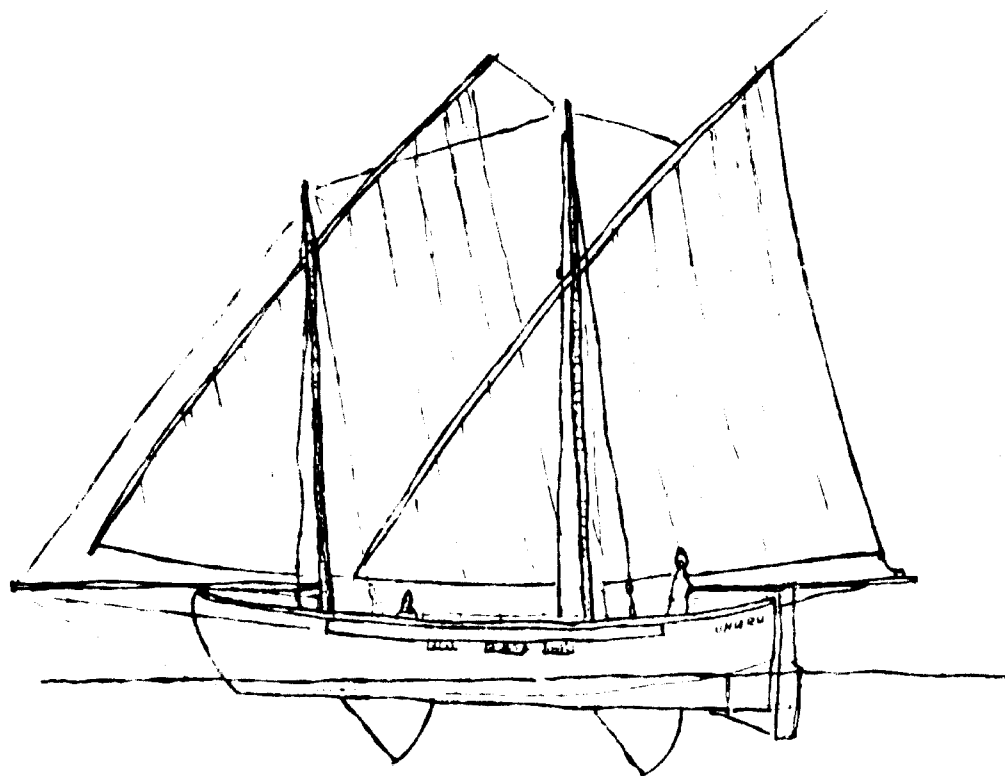
Especially in the poorest part of the developing countries the fishing is taking place mainly in ocean-facing villages without any harbour facilities.

Here fishing is typically the dominating occupation and thus the activity from which the living conditions of the local population depend.

The fishing in these societies has got links back to ancient times is utilizing a sturdy technology having scope for development by utilizing so-called soft technology solutions.

However - many of these small societies are threatened. They are threatened by the big industrial nations of the world in that those nations are overfishing the waters off shore the developing countries. It is increasingly difficult to contain the existing or increasing population in the small societies based on the traditional fishery. The catching areas will have to be expanded by improving the fishing fleet as well as the fishing equipment.

The first problem is temporarily being solved by extension of the national territorial waters. The traditional fishing methods will hardly be able to take credit of those extended areas. A possibility then would be to give fishing licences to foreign fishing fleets mainly in the leading



fishing nations. Thus the overfishing problems again are in focus.

There is a widespread belief that expansion of the local small scale fishing cannot cope with the scope for bigger fish landings through the new fishery boarders. This has given natural wind no consideration about establishing large scale fishing projects, projects that are connected to the larger harbours in the developing countries.

Those projects are capital intensive and need foreign exchange. they are based on an economy and technique following a pattern developed and utilized in the powerfull fishing nations. They are not without problems for the developing countries.

Without any doubt there is need for establishing modern large scale fishing fleets for the supply of big cities and for export. However a multitude of unexplored possibilities exist in supporting the coast-based fishing industri. By utilizing the local knowledge, skills and tradition it is possible to establish a broad, integrated expansion of the fishing industry and generally support the industrial potential in the local societies along the coasts.

This is an introduction made by a group of people trying to establish the following project along the East African coast:

The project is developed in order to meet a series of fishery-technological problems evolving when trying to modernize the traditional coastbased fishing in developing countries.

Thus it may be resonable to specify what requirements are necessary for projects of this type.

First of all - the fishing boats must be able to land directly on the coast, they must be able to pass coral refs - more or less like the boats traditionally being operated from the North Sea coasts of Europe.

Secondly - the construction, repair and maintance should as far as possible be manageable by the local people. This means that materials must be local or sufficiently known and available so that no break in

the supply can occur. This also includes that local knowledge and skills is utilized as far as possible. Thus the need for foreign experts and the general requirements to the local education system is decreased.

The fishing fleet must be able to operate without being solely dependent on oil-supply and oil-economy. This requirement is important not only because of the all too well known supply problems but also because fishery projects of the kind in question are particularly relevant in the poorest part of the developing countries where fuel economy is an important aspect of daily life.

Lastly - the fishery project should be able to improve the facilities for storage of fish so that the increased catches can be established without the traditional strick requirements for immediate sale and distribution.

The project is in two parts: namely development of prototype of a sailing vessel useful for trawling lines and nets, and development of a mobile ice-factory. Both of them have got great flexibility as to adaptation to local conditions.

The prototype is meant for trial rather than strick solutions. It has got an overall length of 10.5 metres, beam 4 metres and it draws 0.7 metres of water without and about 1.8 metres with the centerboards down.

The shape of the hull and the use of centerboards is the prerequisite for operating the boat on any coastline without any sort of harbour-facility. The ship is self-bailing as all decks are above the water line. Thus it cannot sink. There is a small cabin fore where the crew can stay during bad weather.

For the construction of the hull is used ferrocement because it is cheap, easy to work with and to repair in the local areas. The maintenance cost is low as one can save the expensive antifouling paint.

The hull is a typical shell construction with all curved lines and thus strong. To produce such a concrete hull it will be necessary to have a fixed formwork which will have to be produced in a well equipped workshop. After being transported to the place of production it can be used over and over again by the local shipbuilders.



Because of the ever increasing oil prices, problems of supply to the local areas and as a means of saving foreign currency the ship is intended to be equipped with sails. The rig will be simple, easy to build and easy to handle. It will be adaptable to the local conditions and traditions.

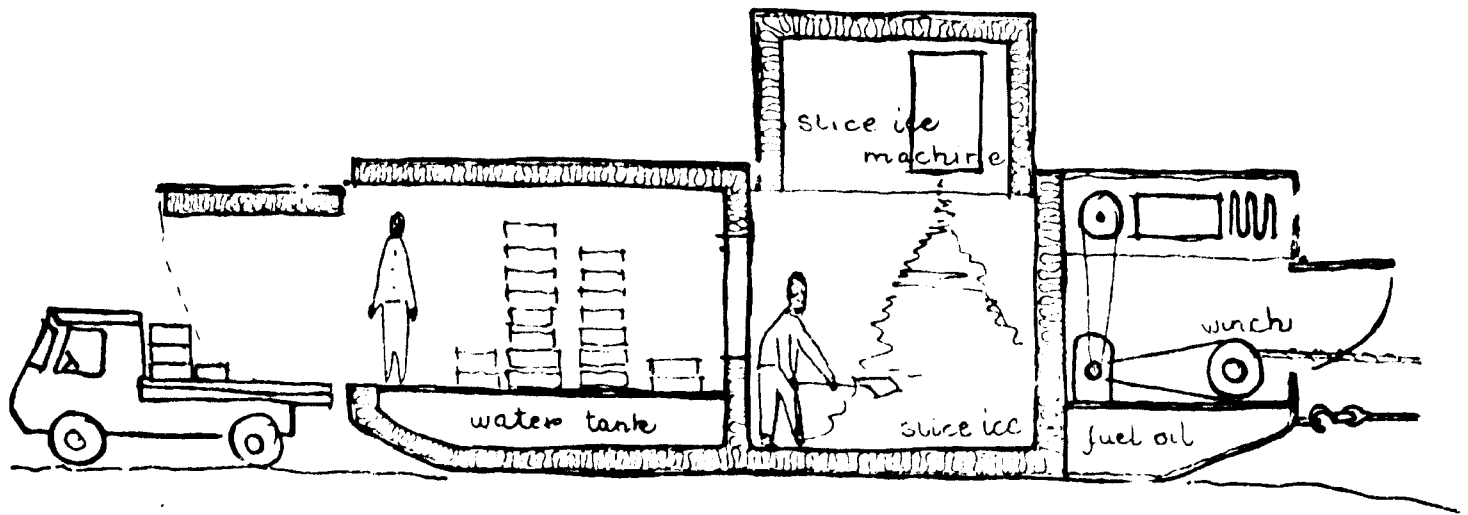
Sailing boats are well known and accepted in most small fishing societies in developing countries where the wind conditions normally are quite regular. Still a small engine in many cases will be valuable as a supplement to the sails. Thus the vessel is designed for easy installation of a small diesel engine. In the proto type is foreseen a simple air cooled 5-8 HP engine with belt transmission. This is a cheap equipment and easy to maintain. It may be possible as well to install more traditional marine engines.

Big problems exist in tropical areas of keeping the catch until landing, marketing or processing has taken place. This problem is even escalating with the extension of the action areas of the fishing vessels. That's why the ship is equipped with a well insulated fishhold containing 4 cu.metres of ice and fish. This fishhold is divided in four so that one can be handled without disturbing the others.

The other part of the project is the development of a mobile ice-factory in that the supply of ice is a common problem for establishing de-centralized fishing projects. In most cases local landing spots will be far away from existing ice works and thus the limited marketing possibilities will be severely hampering the landings of fish.

The idea is to develop an icework in the shape of a big container with floating ability. As will be seen from the illustration the container is housing a flake ice machine, an ice tank and a cold store for fish. Furthermore is contained a freshwater tank, a fuel tank and a machine section.

The container should be build in a well equipped workshop and be transported to the area of operation. By the help of the winch the container is able to tow itself up on the beach. Also when fixed on the beach the winch may be used to pull in the fishing vessels. The container may as



*Section in container*

well operate on the water floating in lee waters in lagoons, behind islands or up rivers.

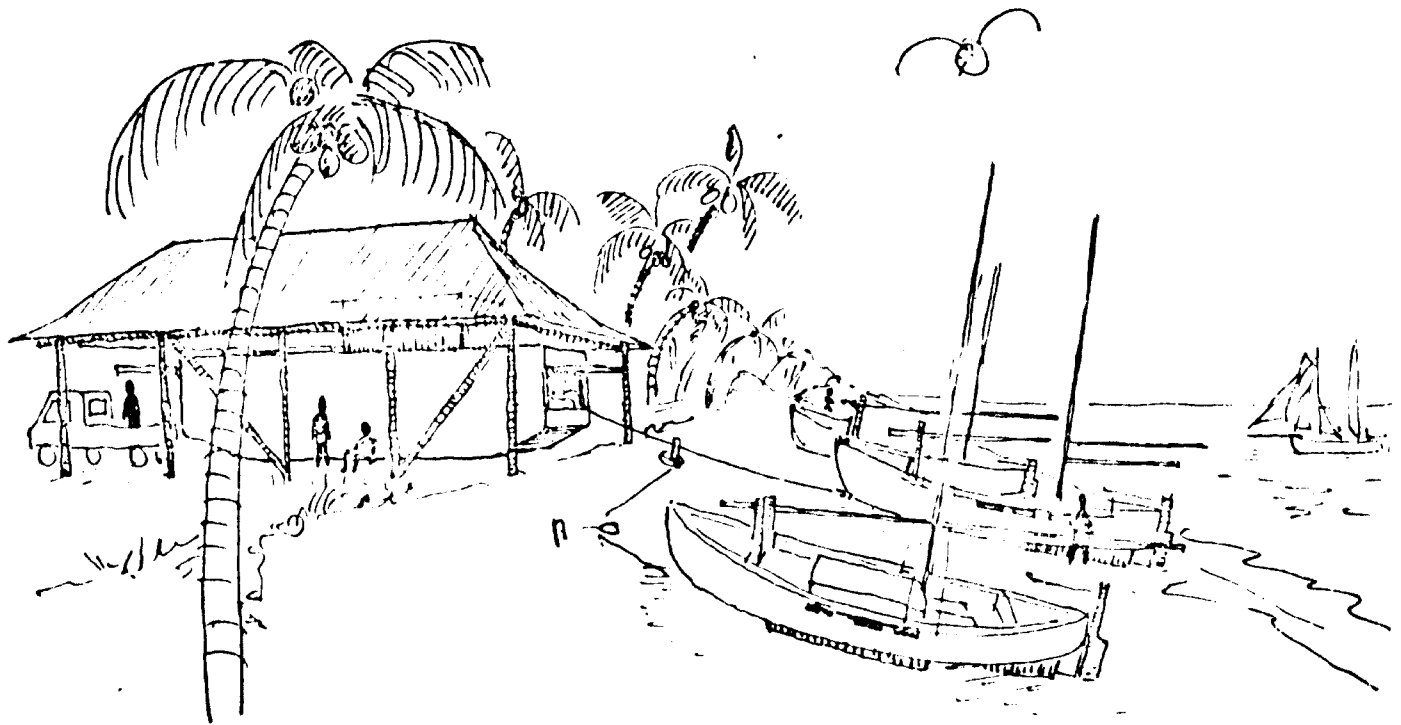
By implementing the project a lot of problems will most likely occur. Those problems may be technical as well as social and will have to find their solution directly on the spot. Although it may be difficult to point out specific problems with a project like this it may be valuable to look at some areas which may cause problems.

First of all - it may be difficult to obtain local acceptance - even with a such project which design gives ample room for utilization of local rigging. The local boat design will have to be accepted as far as possible when implementing the project

Secondly - the economic effect in the local area will be optimized if the project will be able to stimulate the existing or the establishment of new small scale industries and service facilities for the fishing industry. Those small scale industries may be boat builders, sail makers, mechanics etc. However - those small scale industries may not be available in sufficient numbers in the local area why it may be necessary to establish a supporting programme for development of those trades.

One of the advantages of the project is <sup>the omittance of</sup> a lot of problems concerning education and training, organization and economics which are often related to large scale fishery projects. Advanced navigation equipment and fishing gear is giving headache with training and service. Social organization breaking the traditions in certain communities are often decisive for success or failure in large scale projects. This may be omitted in this small scale project. Lastly - capacity and feasibility problems so well known from large scale projects have a bigger chance of being overcome.

As above mentioned the project is not supposed to be a universal project ment to solve all problems of fishery for the developing countries. The project is specially developed for utilization in the poorest part of the developing world where generations of fishermen have operated without harbour facilities of any kind.



*Landing place*

On one side the project is sturdy towards energy, spare or other crises and on the other side it requires very little concerning education and training as well as establishment of technical facilities around the catching areas.

The advantage of the project is the deliberate effort of stimulating a number of small local economic units, partly by boosting the industrial activities, partly by establishing possibilities for extending the local supply of fish to larger areas than is possible to-day.

Thus the project may act as an important component as supporting larger regional integrated development projects based on a de-centralized development strategy.

The project may thus be a solid regional and local supplement to the national fishing projects which are being established in most developing countries. Projects which are to a very limited extent utilizing the know-how and experience about fishery, dormant in the small societies of fishermen all over the country.

THE SISTER INDUSTRIES.

The SISTER INDUSTRIES arrangement is based on ideas which have been tried out by the Swedish donor agency SIDA in Swaziland, Botswana and Tanzania.

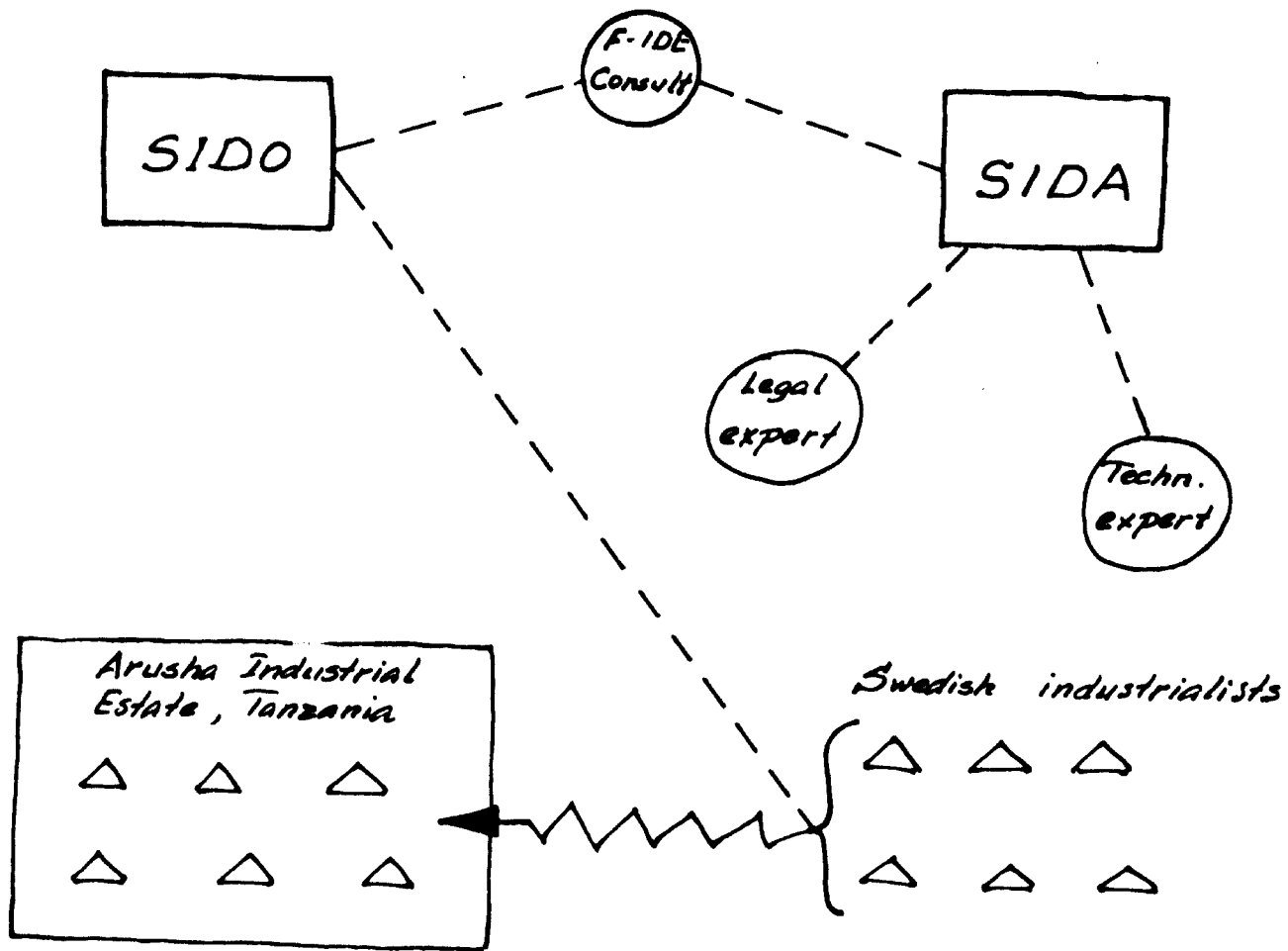
In 1975 SIDA launched a programme of industrial co-operation to identify ways and means in which SIDA together with Swedish small scale industrialists could contribute to the industrial development of Swaziland. The objective was to determine whether there were similarities between the resources and capabilities of the Swedish private sector and viable projects in the industrial sector in Swaziland.

Particular attention was paid to the effective transfer of technology and skills in management, marketing and entrepreneurship. SIDA appointed a consultant to assist in the identification of suitable industrialists in Sweden. The consultancy firm had specialized knowledge and experience in small scale industries in Sweden and a grasp of the most likely industrial projects feasible and viable for development countries. On the basis of the requirements in Swaziland, determined by Small Enterprises Development Company in Swaziland (SEDCO), SIDA and the consultant sought out potential Swedish partners that appeared to have the interest in participating in the development of small scale industries in Swaziland in a way that would be a mutual advantage.

Later on representatives from SEDCO visited those Swedish industries that were selected. The next step in the process included a visit by selected Swedish industrialists to Swaziland in order to meet officials and entrepreneurs on the spot to learn about the local conditions and to explore ways of cooperation. The outcome of the mission was that Swedish industrialists will assist SEDCO to set up industries. The Swedish firms will participate in the selection of machinery, training local personnel and assist in marketing and in running the ventures.

The cost for the services rendered by the Swedish industrialists is met by funds made available by SIDA to Swaziland. In one of the cases a Swedish industrialist is considering to enter into partnership with an entrepreneur in Swaziland.

# "SISTER INDUSTRIES" AGREEMENT



-----

Contracts

~~~~~

Transfer of machinery,  
know-how etc.

Similar programmes are launched in Botswana and Tanzania whereby selected Swedish industrialists have paid visits to those countries. A visit to Kenya of about six Swedish industrialists is scheduled to take place in December this year with the aim of assisting or participating in the development of small and medium scale industries in Kenya.

The SISTER INDUSTRY agreement is one method of introducing small manufacturing industries employing new products and technologies. Such an agreement may comprise different kinds of cooperation between a small or middle sized industrial unit in an industrialized country and in a planned or newly established unit (SISTER INDUSTRY) in a developing country. Thus technical know how and managerial experience for a particular type of industry could be transferred from a unit in an industrialized country to a new unit in the developing country. Such an agreement could facilitate proper starting of production, guidance and training, including fellowship arrangements, during the first crucial 5 - 10 years of production. It could eventually develop into a commercial agreement in the form of a joint venture, subcontracting etc. between the involved units in the industrialized versus the developing country.

Industries which could be of great interest may be different types of metal manufacturing, especially farm implements and tools and simple machinery for other small scale industries. Also educational equipment may be important.

In the process of selecting suitable industries for SISTER INDUSTRIES agreements it is important that particular emphasis is given to the possibilities of transferring technology which is adapted to the local conditions. Factors such as the creation of employment, utilization of local raw materials and saving of foreign exchange should also be taken into consideration. In this kind of agreement it is important to avoid a donor-recipient type of relationship and therefore it is necessary that the partner from the developing country clearly defines his needs and maintains a controlling interest in the implementation phase.



THE OVERALL STRATEGY.

It has been commonly accepted by most parties that industrial development in a national context is best helped "off the ground" by the establishment of service centres in metropolitan areas. These service centres are normally termed "Industrial Estates" which in line with the definition by UNIDO is "a planned clustering of industrial enterprises offering standard factory buildings erected in advance of demand, and a variety of services and facilities to the occupants".

By its very nature an industrial estate will attract potential entrepreneurs and will act as a 'magneto' to industrial enterprises. This will tend to cause urbanization and promotion of medium scale industries.

Other parties involved in development strategies claim that to reach the real needy people in the villages and the rural areas it is not desirable to invest in industrial estates. They would rather put all efforts in supporting rural extension services sending out armies of extension workers to the villages.

It is still to some extent an open question which approach to be chosen.

It is believed an alternative in between will have to be adopted. Small scale industrial development cannot stand by its own - it has to be looked upon in a broad context as part of the overall national industrial development. That's why the industrial estates will play an important part in acting as the regional promotion and support centre for small and medium scale industries.

However - the important point is, how to get right into the villages?

No planned efforts have so far been put into the great problem of how to create and maintain the important link between the metropol and the satellites.

This is mainly due to the fact that once established the industrial estates has been fully occupied promoting metropolitan industries. This is as well important but still the fact remains that the rural entrepreneur is left out.

How then could that task be accomplished with? In theory it may look as follows:

A metropol/satellite model with the following physics and functions:

REGIONAL CENTRE.

A 'brain centre' with focus on training and information.

Will contain:

Workshop for training and common facilities.

Store for raw material and tools.

Glass room.

Workshop for temporary training.

Dormitory and canteen.

Offices.

Library.

Show room for different products.

The functions will be:

Product oriented training.

Common facilities workshop.

Extension services.

Project preparation.

Loan preparation.

Marketing & supplies assistance.

Facilities for temporary training.

Introduction of new products.

Industrial information.

Assistance to Industrial Promotion Area (IPA).

Also the IPA may be included physically, but in principle this should act - and could be located anywhere - more or less like,

RURAL CENTRE.

A 'brain centre' linking REGIONAL CENTRE and Villages.

Will in principle be a 'site and service scheme' offering infrastructural facilities to entrepreneurs. May also include a small common facility

workshop and a small store for raw materials and tools. Also included could be a workshop for temporary training certain techniques or skills. A mobile workshop may be included to serve the remote areas.

The functions will be:

Industrial Promotion Area (IPA) - main function  
Common facilities workshop.  
Extension service.  
Temporary training.

A very important goal of the whole set-up will be to reach the -

VILLAGE WORKSHOP.

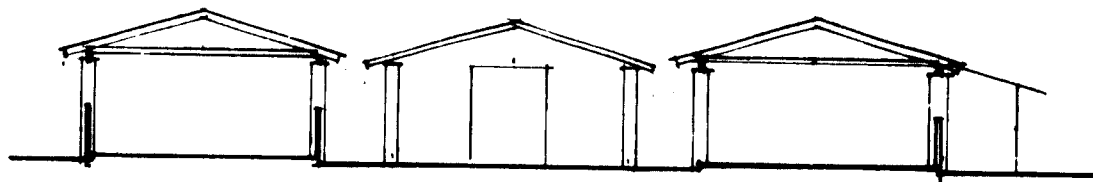
Mainly in order to create some 'demonstration workshops' but also in order to get the extension workers started at a relevant level it is proposed to invent some village workshops. These workshops as well as existing and other up-coming enterprises should be served mainly by the RURAL CENTRE and as well by the REGIONAL CENTRE.

The RURAL CENTRE will create an important link between the VILLAGE WORKSHOP and the REGIONAL CENTRE.

A very important aspect of this set-up is information on and dissemination of appropriate technology. The following draft proposal will be an example of how this could be established in Tanzania:

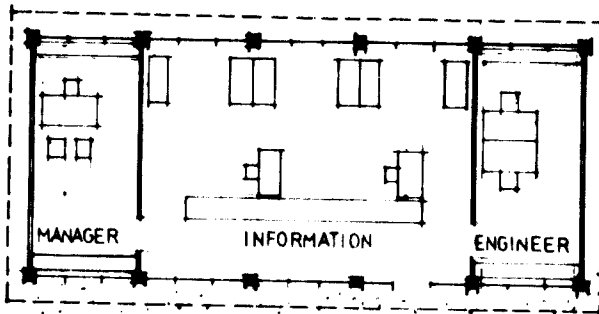
DRAFT PROPOSAL FOR NATIONAL DOCUMENTATION  
INFORMATION DEPARTMENT WITHIN THE RESEARCH  
AND PLANNING DIVISION OF SIDO.

In order to strengthen the present activities within SIDO on promotion of small industries development in Tanzania with special emphasis on dissemination of appropriate technology into the rural areas it has been realised a priority to establish a nationwide documentation and information set up.



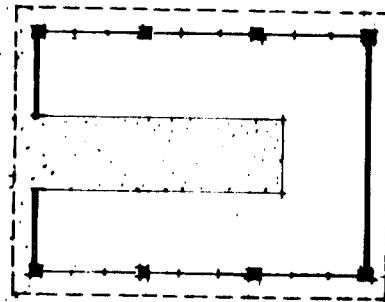
ADMINISTRATION  
SECTION

WORK SHOP

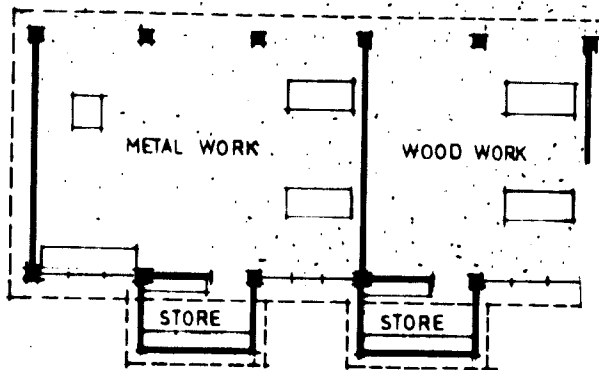


ADMINISTRATION 95 M<sup>2</sup>

OPEN YARD



DISPLAY 55 M<sup>2</sup>



WORKSHOP 100 M<sup>2</sup>

*Documentation & information centre.*

The already existing regional offices are in need of a multitude of information from outside sources. The most rationale attempt to fulfill this need will be the SIDO Headquarter to select, collect, compile and distribute these information.

SIDO H.Q. is already involved heavily in these activities and is in contact to the major inventors of appropriate technology all over the world.

Although something has been done a lot is left behind as establishing more formal connections to overseas organisations, compiling and organizing the existing information material and not least, distributing the material as well as follow up in the field as to dissemination of the technology in the local societies.

It is believed the aspiration level of the government pertaining to rural development is best fulfilled by a massive effort on information and education of the people by demonstration and visualizing the alternative possibilities they have as to establishment of small scale industries in their specific surroundings.

For that purpose it is suggested to establish a central library within SIDO's H.Q. and attached hereto a small printing press.

A similar library will be established in each regional readquarter (19 in total) which will also house the SIDO regional office.

Thus the central library will supply regularly and on special requests any literature, instructions, production schemes, treatises or audio-visual aids which may be appropriate to the needs of the regions.

The H.Q. is already engaged in preparing so-called "schemes" which are simple instructions on how to embark on particular small scale industries. These "schemes" cover all aspects pertaining to start up from scratch that particular industry. They are made very illustrative and translated into Swahili.

As there is a tremendous need for these "schemes" the out-put will have to be increased considerably.

The proposal includes production of audio-visual aids to be used by mobile units - one in each region. The material may be produced by the Audio Visual Institution in Dar es Salaam in co-operation with SIDO.

Also included is the establishment of a workshop for production of prototypes of appropriate technology. These prototypes are already existing at different institutions inside and outside Tanzania. The idea is to purchase one sample of each-produce it in the workshop mentioned and distribute the fully developed prototype to the regional office which will then take care of the introduction of the product.

It is recognized important to distribute the proto-types physically as this will give our field officers a better chance to introduce the items through field demonstration.

In order to establish formal contacts to the institutions abroad and get a comprehensive insight of their activities it is found necessary for two officers from SIDO's technical service department to visit a number of countries on a round trip.

The proposal describes the base for a nationwide technical service invented through SIDO. It is aimed at co-ordinating the efforts done by a multitude of institutions and persons involved in appropriate technology development and dissemination of the same into the Tanzania rural society.

POLICY INCENTIVES.

Apart from the policy-incentives and -measures for small scale enterprises mentioned earlier in this paper one may point to the taxation and financing system as being often favouring large scale enterprises.

Also import regulations are often being restrictive to small enterprises. One may find a lot of developing countries having banned import of second-hand machinery just to mention one example. Second-hand machinery may technically be in as good a condition as new machinery and the price may only be a fraction of the new price.

As a matter of fact governments may be able to do a lot towards application of appropriate technology in small scale industrial development. However - large public or governmental organizations tend to be beset by bureaucratic inefficiencies and administrative weaknesses and by its very nature there are some justified doubts as to their ability to promote in a direct way the development of appropriate technology.

Government agencies nevertheless do have a very important role to play. Possibly not as industrial entrepreneurs but rather as the indirect supporters of low-cost technology. In every society there are entrepreneurs and innovators but what happens is that the initiative of such people is often being stifled by the government bureaucracy, the banking and credit system, the marketing and distribution organisations and also by the social pressures against innovation and change.

The role of the government is mainly to create a more favourable climate for the development of entrepreneurship, to help initiate within the receiving community, a process of innovation and self-sustaining growth. Intermediate or appropriate technology, contrary to large-scale modern technology, is probably one of the fields in which a country can assert its sovereignty in the most effective and positive way. This means that national governments in the developing countries may have a great impact on the dissemination of appropriate technology.

SUMMARY AND CONCLUSIONS.

Most technologists in western countries are not acquainted with the concept of choice of technology. Technology in the western world is seldomly recognized as a matter of choice. Technology is developed as a consequence of research and its utilization is based on profit criteria.

The conditions in the developing countries are so much different and the discussion may here be concentrated on three questions:

- 1) There is no alternative to the most modern technology. The choice for the developing countries is to maximize economic growth through utilization of western technology.
- 2) In the choice of technology shadow pricing should be used. Also adaptation of technology to the local conditions should take place. Intermediate technology should be actively searched for.
- 3) Shadow pricing is useless as long as the market prices are not related to the shadow prices. This is possible only if the international and national political and structural relations determining the market prices are changed. Such political and structural changes must take place.

It is believed the answer to 1) is that too many negative effects will be the consequence if a development strategy is based solely on modern technology and large scale industries.

The answer to question 3) will be that political matters are no concern of outsiders especially not non-politicians. Thus we may leave that question out.

Left with 2) the paper is accepting that there is an alternative to western technology. It is not being argued that alternative technology and small scale industries are the only answers to the industrialization process. Appropriate technology should be used in the modern large scale industry as well as in the rural small scale industry. Only the concept is different.



The paper is dealing with the rural small scale industries and is exemplifying the problems and possibilities by three examples from East Africa:

The UTUNDU PROGRAMME is a very comprehensive countrywide programme aimed at mobilization of the strategic productive force of the blacksmiths of Tanzania. If successful the programme may well symbolize a new era of development planning - a development for the people - and by the people.

The FISHERY PROJECT is a "soft technology" solution to the coastal fishery in the rural areas where no harbour facilities exist. The project is typically exhibiting forward and backward linkages in the local economy. It is aiming at stimulating a series of small scale enterprises related to boat-building, blacksmithy, sail-making, fish-processing and -distribution etc. The project may be an important component in regional development projects based on de-centralized development strategies.

The SISTER INDUSTRIES agreement is a programme whereby know-how, technology and management is being transferred from an industrial enterprise in an industrialized country - notably Sweden - to a similar up-coming or already established industry in a developing country.

All three projects are in the introductory phase thus it is not possible as yet to make any reasonable evaluation of the outcome. However - the first two projects have a lot of ingredients giving prospects to rural development. The last project is a very good example of transfer of appropriate technology to industries in a developing country.



**B-35**



**79.12.03**