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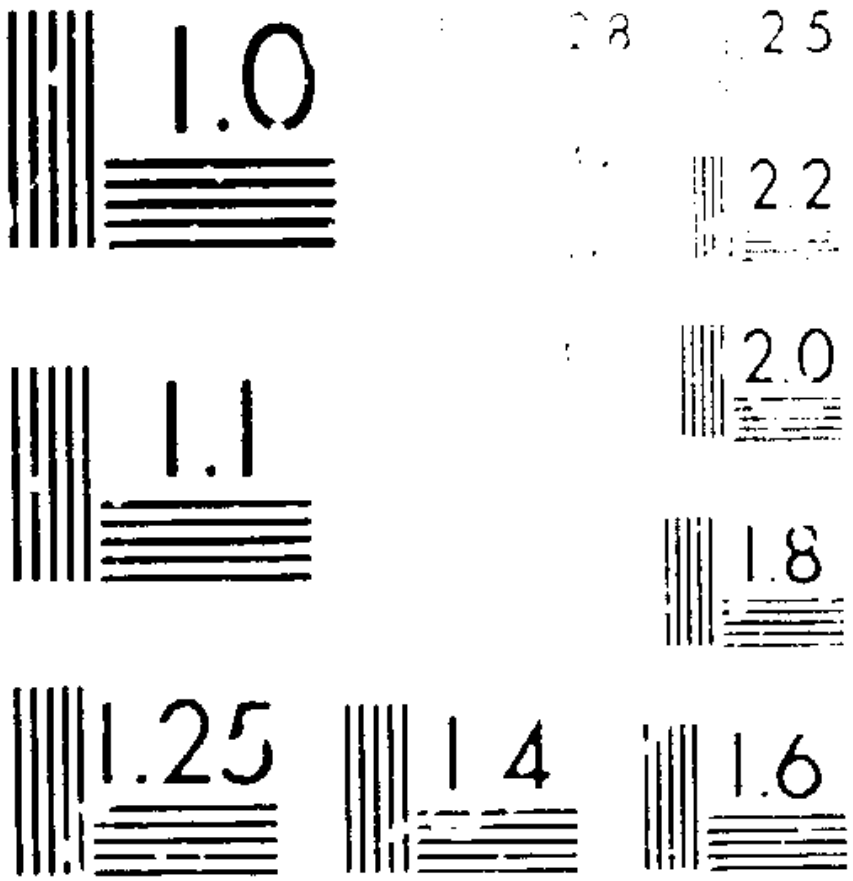
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Distr.
LIMITED

ID/WG.362/8
14 January 1982

ENGLISH

United Nations Industrial Development Organization

Preparatory Meeting of Directors of
Industrial Development Finance Institutions (IDFI)
on the Creation of a Technological Information
Exchange Network (TIEN)

Bridgetown, Barbados, 26 - 28 January 1982

COUNTRY BRIEF: TANZANIA*

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V.82-20519

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1. INTRODUCTION

1.1 In order to understand the growth of the industrial sector and the contribution of industrial financing and technology development, it is necessary to briefly outline the institutional structure which has been evolved to promote development in the country. This evolution has been a continuous process from the pre-independence period.

2. INSTITUTIONAL STRUCTURE

2.1 The major institution responsible for investment decisions and technology development are the economic ministries through their holding corporations and research institutes. The present institutional structure is as follows:-

2.1.1. Ministry of Industries:

- National Development Corporation (NDC) with respect to all metal industries.
- National Chemical Industries (NCI) for all chemical industries
- Tanzania Industrial Consultancy Organisation (TISCO) for industrial consultancy and advisory services.
- Tanzania Agricultural Machinery Testing Unit (TAMTU)
- Tanzania Engineering and Manufacturing Design Organisation (TEMDC)
- Small-Scale Industrial Organisation (SIDO)
- Tanzania Industrial Research and Development Organisation (TIRDO) for conducting and promoting industrial research particularly regarding use of local raw materials, manpower training, monitoring co-ordination of research, dissemination of information, control and regulation of industrial processes.
- Tanzania Bureau of Standards (TBS).

2.1.2 Ministry of Agriculture:

- National Agriculture and Food Corporation (NAFCO)
- National Milling Corporation (NMC)
- Sugar Development Corporation (SUDECO)
- General Agricultural Research Organisation (TARO)
- General Agriculture Products Export Corporation (GAPEX)
- Crop Authorities: Tea, Cotton, tobacco, coffee, sisal, cashewnuts, pyrethrum.

2.1.3 Ministry of Natural Resources and Tourism:

- Tanzania Wood Corporation (TWICO) responsible for all wood industries;
- Tanzania Fisheries Corporation (TAFICO);
- Forestry Research Institute;
- Fishery Research Institute

2.1.4 Ministry of Livestock Development:

- Livestock Development Authority
- Livestock Research Institute
- Wildlife Research Institute

2.1.5 Ministry of Labour & Welfare:

- National Vocational Training Centre
- National Institute of Productivity (NIP)

2.1.6 Ministry of Works:

- Mwanachi Engineering and Contracting Company Ltd (MECCO)
- National Estates and Designing Company Ltd (NEDCO)

2.1.7 Ministry of Planning and Economic Affairs:-

- National Scientific Research Council

2.1.8 Ministry of Water and Energy:

- Tanzania Electricity Supply Corporation (TANESCO)
- Tanzania Petroleum Development Corporation

2.1.9 Ministry of Mining:

- State Mining Corporation (STC)

2.1.10- Ministry of Manpower Development:

- The Institute of Development Management (IDM)

2.1.11 Ministry of National Education:

- University of Dar es Salaam
- The Institute of Development Studies (IDS)
- The Economic Research Bureau (ERB)
- The Bureau for Resource Assessment and Land Use Planning (ERALUP)
- The Institute for the Study of Tropical Medicine
- The Institute of Marine Sciences
- The Institute of Production Innovation (IPI)

2.1.12 Ministry of Communication & Transport:

- Tanzania Post and Telecommunication Corporation
- Tanzania Railways Corporation
- National Transport Corporation
- Tanzania Harbours Authority
- Tanzania Air Corporation

2.1.13 Ministry of Trade and Commerce:

- Board of External Trade
- Board of Internal Trade
- State Motor Corporation

2.1.14 Ministry of Finance:

- Bank of Tanzania (BOT)
- National Bank of Commerce (NBC)
- Tanzania Investment Bank (TIB)
- Tanzania Rural Development Bank (TRDB)
- Tanzania Housing Bank (THB)
- Institute of Finance Management (IFM)
- National Insurance Corporation (NIC)
- Tanzania Audit Corporation (TAC)

2.1.15 Ministry of Health:

- Muhimbili Medical Centre
- National Food and Nutrition Centre

2.1.16 - Ministry of Lands, Housing and Urban Development:

- National Housing Corporation (NHC)
- Tanzania Concrete Aryicles

2.2 From the foregoing, it is recognised that the country has established a fabric of technology and development corporation infrastructure. But the system does not have an organic link. In the absence of a technology strategy and policy, the structure does not have a uniform approach to solving technological problems. The technology institutions and the development utilisation corporations operate autonomously. Their activities are not co-ordinately by any national organ. Accountability of their programmes is through their respective parent ministries. In most cases the programmes of work of the technology institutions is prepared by the institutions themselves. Normally, these programmes of work of the technology institutions ought to be vetted by the parent ministries so that they can be co-ordinated with the ministries' sectoral development policies as well as the national curriculum of technical education. The present situation in Tanzania is that the majority of economic ministries are inadequately staffed with technical people.

Hence, their technical capacity to prepare general technology guidelines or to vet programmes of work prepared by their technological institutions is handicapped. It is also observed that most of the industries in Tanzania were established with assistance from external collaborators. Thust most of them still operate under foreign management and technical agreements. The technological links of these industries is still with external rather than internal institutions. The general problem arising out of this relationship is that there is very limited internal diffusion of technology. Perhaps the most significant feature of the current scene in Tanzania with regard to applied technology is that of total transfer of foreign technology from developed countries to Tanzania. The process of acquisition, adaption and absorption of technology does not seem to be taking place.

2.3 During the last two decades state enterprises in Tanzania have assumed a position of very great importance in the process of industrial development. But is also recognized that private sector in Tanzania still has an important and vital role to society, to initiate, manage and run its activities in all sectors of economy in ways that are conducive to the promotion of equitable social and economic development.

3. STATE ENTERPRISES

3.1 The origins and motives for establishing industrial development financing of state enterprises are severel. It is important to understand first their source and methodology of establishment. Their origins are basically the following:-

3.1.1 Through the process of inheritance

At the attainment of independence, a number of institutions were inherited from the colonial government for example, post and telegraph, airways, railways.

3.1.2 Through the process of nationalisation

This has been by conscious decision following the Arusha Declaration of 1967. There are two aspects of nationalization policy. These are:-

(i) taking over of the existing private enterprises for public management; and

(ii) demarcating areas for future growth and expansion of the public sector.

3.1.3 Through the process of negotiation and purchase

This process involved purchases of private firms by government.

3.1.4 By takeover of 'sick' private enterprises

There were a few enterprises in Tanzania which were takenover because of a poor communication between the private owners and the workers.

3.1.5 By the process of public entrepreneurship

Most of the state enterprises in Tanzania to-day were established in the normal business process through state entrepreneurship. The major holding corporations mentioned above have a number of subsidiary companies.

4. INDUSTRIAL DEVELOPMENT FINANCING

4.1 During the first five years of independence, (December 1961 to December 1966) the availability of credit and the working of the bank system constituted a continuation of the pre-colonial system with foreign owned commercial banks operating according to policies made outside the country. Medium and long-term credit was made available through the hire purchase institutions and finance houses based in Nairobi or even further away.

4.2 Pure development finance was in the hands of the National Development Corporation as the only publicly owned holding and promoting agency and also the Tanganyika Development Finance (Bank) Company Limited - a promoting and investment company jointly owned by the Tanzanian Government, the Commonwealth Development Corporation, the Deutsche Gesellschaft fur Wirtschaftliche Zusammenarbeit (Entwicklungsgesellschaft) mbH of the Federal Republic of Germany and Financierings Maarschappij voor Ontwikkelingslanden NV of the Netherlands.

4.3 Agricultural finance for crop marketing was provided by the National Co-operative Bank owned by shareholders of the large co-operative unions and refinanced by British Banks. Agricultural development was the domain of the National Development Credit Agency.

4.4 Following the Arusha Declaration February 5, 1967, the principal elements of the economy were brought under the public ownership. The following parastatals were formed as instruments for industrial development and technology development:

- The National Bank of Commerce
- State Trading Corporation
- Tanzania Sisal Corporation
- National Milling Corporation
- National Insurance Corporation

4.5 The National Development Corporation continued to expand its portfolio. The large group of companies wholly or partly owned by the National Development Corporation, the other public corporation previously in existence such as the Agricultural and Commodity Boards for Tea, Coffee, Wheat, Cotton including the new corporations set up under the Nationalization Acts resulted in a very significant part of the Tanzania economy being in the hands of the semi-autonomous public institutions commonly called 'parastatals' in Tanzania. These parastatals are basically charged with the responsibility of project formulation, execution and selection of appropriate technology.

4.6 The National Bank of Commerce was formed as a successor to the private commercial banks. Commercial credit and loan policy was made a national objective. The increasing need for medium and long-term commercial finance for the implementation of development projects in both the public and private productive sectors of the economy soon led to the establishment of a long term lending programme by the National Bank of Commerce with the main concentration of these specialized activities in a newly created Development Credit Programme.

5. THE REORGANISATION AND RATIONALISATION OF THE PUBLIC SECTOR

5.1 Since 1969 the Government had given increasing thought to plans for re-organizing the financial sector. This thought had been strengthened by the creation of the various sectorally specialized public corporations in 1969 such as:

- The Tanzania Tourist Corporation
- The National Agriculture and Food Corporation
- The National Transport Corporation
- The Tanzania Fish Corporation
- The Sugar Development Corporation
- The Tanzania Textile Corporation
- The National Development Corporation
- The Cement Authority
- The Tea Authority
- The Cotton Authority
- The Sisal Corporation
- The State Mining Corporation
- The Petroleum Development Corporation.

5.2 To-day there are over three hundred parastatal organisations in Tanzania. All these parastatals are focussing on specific needs of financial requirements and technology transfer related to their sectoral activities.

5.3 Although the above sectorally specialised public corporations were expected to be financed largely from the exchequer funds and from their own internally generated resources including direct external grants, loans or suppliers' credit, it was realised in the late '60s that there was a need for investment and banking institutions which by virtue of their development specialisation and professional capacity could act as a channel of foreign loan funds destined to be used for financing of productive enterprises and also serve as instruments for proper regulation, evaluation, co-ordination and supervision of the use of public finance for the parastatal and private sector through objective project analysis including testing of their economic and technical feasibility.

5.4 The most important strategy of rendering services to the sectoral activities was the re-organisation and rationalization of the financial sector which resulted in the following division of responsibilities.-

5.4.1 The Bank of Tanzania, as the country's central bank, exercises the financial control over the policies and performance of other banks and financial institutions; allocates foreign exchange to various projects; approves import licences; scrutinize management and technical agreements with other government bodies; approves suppliers' credit and manages the administration of external debts. These functions are in addition to other traditional responsibilities generally in the hands of all central banks.

5.4.2 The Tanzania Rural Development Bank provides development finance for the rural sector including the participation in financing small industries and other industrial commercial projects on a geographical basis within the country.

5.4.3 The Tanzania Investment Bank provides development finance for all productive sectors including large scale corporate agriculture, ranching and fishing.

5.4.4 The National Bank of Commerce provides short-term credit for financing working capital for all industries - small, medium and large.

5.4.5 The Tanganyika Development Finance (Bank) Company acts as a project promoter both in terms of risk capital and through loan finance for small medium scale industries.

5.4.6 The Tanzania Housing Bank provides dwelling houses as well as office and commercial buildings.

5.5 This reorganisation was to ensure that there was a clearly defined sphere of responsibility between the financing of commercial and development aspects.

6. FUNCTIONS OF FINANCIAL INSTITUTIONS

6.1 Industrial development financing in Tanzania has several motivations interwoven with the economic and social reasons for state control on the establishment of all enterprises. The basic functions of all financial sector are:-

- Resource mobilization
- Project Promotion
- Technology Development

(a) Resource Mobilization

6.2 The reorganization and rationalization of the financial institutions discussed in the foregoing is designed to enable these banks to raise resources locally and overseas for their own investment expansion and for development activities elsewhere in the economy. The above classification of responsibilities excludes the competitive situation where these financial institutions are likely to compete for resources for the same activities. Resource mobilization for technology promotion and project financing is one of the keystone of any development finance institution.

(b) Project Promotion

6.3 It is obvious that policies of accelerated industrial development are impossible to be implemented effectively without the assistance of financial institutions. The most familiar functions of the development banks in Tanzania is in the area of project identification, promotion, formulation and implementation. An example of project promotion - oriented role of TRDB, TIB, THB and TDFL is in making available long and medium term finance for economic development. 'Economic development' meaning:

6.3.1 the development of the manufacturing, assembly and processing industries including industries engaged in the processing of products of agriculture, forestry or fishing;

6.3.2 the development of the engineering, construction transport, tourism and mining industries;

6.3.3 the development of small, medium and large scale farming including corporate agriculture, ranching, forestry and fishing.

6.4 Promotion of these projects is being done through equity participation, loan financing of capital equipment including feasibility studies and manpower development.

(c) Technology Development

6.5 All the financial institutions mentioned above serve directly or indirectly as instruments for evaluation and selection of technology through objective analysis. This role pre-supposes availability of qualified manpower and technical professionalism within the structures of the financial institutions and also existence of networking of technology information between the banking sector and the technology development centres both within and without the country.

6.6 There are however explicit and implicit example of technology promotion in the Act establishing the Tanzania Investment Bank which stipulates that TIB is also authorized to:-

6.6.1 Undertake research and identification of bankable projects or evaluating investments and carrying out techno-economic feasibility studies in connection with the development of industry and co-ordination with the parastatal organisation for the particular sector;

6.6.2 Provide technical assistance to any industrial concern for promotion or expansion of industry;

6.6.3 Plan, promote and assist to develop industries to fill up any gaps in the industrial sectors of the economy of Tanzania;

6.6.4 Administer such special funds as may from time to time be placed at the disposal of the Bank which can be used for:-

(i) financing on softer terms projects or programmes, for example, small-scale industries with low earning power or with lack of managerial experience or inndequate security etc which are of general economic importance but for which ordinary resources cannot be employed or where the cost of such resources cannot be recovered.

(ii) financing of projects in special sectors which meet the Bank's normal criteria.

(iii) financing of feasibility or other studies for specific development projects or stages of such projects, e.g. mineral research or pioneering agricultural development;

(iv) financing of technical assistance arrangements in respect of projects of high economic value;

(v) financing and nursing projects that can lead into small-scale industries development;

(vi) financing and supporting people with production skills and entrepreneurial talents;

(vii) providing financial assistance for promoting ancillary small-scale industries in conjuction with bigger industries and

(viii) assisting financially such projects that have a chance of becoming viable small-scale industries.

6.7 Among the explicit assignments for all the financial institutions in Tanzania for promotion of applied appropriate technology within the frame work of project selection and implementation, it may be generally be said that the common goals are:

6.7.1 To promote and implement industrial and agricultural programmes using appropriate technology for increasing employment;

6.7.2 To promote and thrust development and expansion of handicrafts, farming, ranching, fishing, small and medium industry and to that end, provide all necessary technical and financial assistance;

6.7.3 To procure suitable machinery and equipment for enterprises and thereby assist in the creation, improvement and adoption of new technology;

6.7.4 To take part in research, scientific and technological financing in connection with industry, mining, entrepreneurial management;

6.7.5 To undertake research and studies relating to the planning of general sectoral economic activities or the implementation of specific projects or operations;

6.7.6 To assist in the development of other research, study, diffusion or training activities and to grant subsidies or grants intended for such ends, as long as they assist to implement development plans.

7. TECHNOLOGY GROWTH IN TANZANIA

(a) Evaluation of Technology

7.1 While noting that the designing of a technology strategy and policy is a matter of crucial concern both to the national economy as well as to the organisational health of the enterprises, it is recognised that in a country like Tanzania with a diversified sectors there could not be any uniform or standardized approach to the question.

The rationale for technology policies of public and private sectors would be greatly conditioned by the nature of the enterprises, the character of their products, the availability of technical manpower and the influence which the local technology development centres and financial institutions can exercise.

7.2 Tanzania had its local agricultural and industrial technology in the past which was discouraged or destroyed during the colonial period. Importation of various basic tools and equipment from the industrialised countries eroded the entrepreneurial spirit for technology innovations. Both the industrial and agricultural sectors including the infrastructural sector have been closed linked to importation of inputs from industrialised countries. There are several reasons for this development. Some of them include the following:-

7.2.1 Known indigenous technology in agriculture and handicraft and domestic industries had to be abandoned in favour of imported technology;

7.2.2 Foreign investors brought into the country their own technologies;

7.2.3 Tied aid had also an in-built element of transplanting foreign technology in the economy;

7.2.4 The use of foreign experts naturally had a tendency of introducing their only known technologies which had been perfected in their own environments;

7.2.5 International lending system of capital also assisted in introducing technologies from the industrialised countries only.

7.3 It is these contacts - bilateral aids, multilateral projects, foreign investments, suppliers' credits, foreign experts - which were powerful in determining the pattern of technology development in the country. It is natural to expect that this powerful foreign influence of technology had a negative impact on the growth of indigenous domestic skills and technology innovations.

(b) External Orientation of Technology

7.4 Tanzania has come gradually to rely heavily on imported technology. For most of its industrial activities began with relatively industrial enclaves of foreign investors particulary during the colonial period. This is the first reason which underlines the character of the present structure of technology. Second, indigenous technology has never been given chance to develop. It was eroded and surpressed by foreign technology. Local industries and indigenous skills have never been given appropriate attention. In most cases it has been completely ignored or abandoned. Third, the import-substitution strategy pursued since indipendence encouraged the establishment of industries which were based on imported technology and dependent on imported inputs. Fourth, knowledge of local resources and indigenous technology has always been scarce or scanty. Fifth, the majority of investment in industry after the Arusha Declaration concentrated on production of intermediate goods which were highly dependent on imported raw materials, foreign technology and management.

Most of the industries were capital-intensive and had no internal linkage in the economy. In view of their dependence on imported raw materials and scarcity of foreign exchange, the majority of these industries have been suffering from undercapacity utilization. Sixth, the attitude of investors local and foreign has always been in favour of applying proven and commercialized technology. In the light of this evolutionary technology growth process, it has not been possible for the economy to develop systematically a pattern of technological self-reliance for self-sustaining growth.

(c) System of Technology Development

7.5 There is no defined system of technology generation and development in Tanzania. There is scanty technology policy guidelines but no clear technology decision-criteria. Decisions on technology selections are made at the time of investment decisions by promoters of investments at different levels.

7.6 In the case of public enterprises in Tanzania, the decision structure for investment decisions is at four levels, namely

- The Parliament or Legislative level
- The Ministerial Level
- The Board Level
- The Management Level
- The International Level

(a) The Legislative Level

7.6.1 Constitutionally all capital expenditure programmes funded by exchequer funds or bilateral aids must be approved by the Parliament. All major project decisions must go through a series of parliamentary scrutiny. The examination of each project covers a whole range of issues including technology choice.

(b) The Ministerial Level

7.6.2 Each economic or sectoral ministry is responsible for execution of national approved programme of development projects. Their inclusion in the national plan entails an economic and technical screening process at ministerial level. The ministerial level represent, actually, the shareholder commitment of investment decision on behalf of the government.

(c) The Board Level

7.6.3 The execution wings of all sectoral ministries are legal entitles known as 'public corporations'. These corporations are run by Board of Governors or Directors. All investment decisions for project implementation are made at board level. Decisions at this level embrace a number of aspects including commercial, economic, financial, technical, managerial and supervision.

(d) The Management Level

7.6.4 At the management level, projects are formulated on the basis of national guidelines. Investment criteria do differ from sector to sector but overall all projects must pass the 'acid test' of financial profitability and technical viability.

(e) The International Level

7.6.5 In the case of tied aids, suppliers Credit, foreign investment, foreign-local joint ventures, externally funded projects, investment and technology decisions are normally externally influenced or decided.

8. EXPERIENCE AND METHODOLOGY OF TECHNOLOGY EVALUATION

8.1 In Tanzania, financial institutions have become key policy instruments in a number of economic decisions. As has been observed so far, the activities of the public sector in Tanzania cover a wide spectrum of industrial activities. It is, generally, agreed that in Tanzania financial institutions play a great role in technology evaluation for projects submitted to them for loan financing.

8.2 The activities of financial institutions in Tanzania cover a wide range of operations from straightforward loans to the provision of risk capital and guarantee of foreign loans. All banks in Tanzania appraise projects submitted to them from the point of view of their economic and financial profitability and technical viability. In most cases, some projects have wider consequences, for example, their impact upon

- foreign exchange earnings or saving
- employment effects
- balance of payments effects
- appropriate industrial structure to generate strong growth promoting effects on other industries and sectors.

All these have to be taken into account in the project appraisal through the use of social accounting prices or shadow prices. All banks - the Tanzania Investment Bank the Tanganyika Development Finance Company including Bank of Tanzania and Rural Development Bank-have established procedures to ensure that their funds are being used to implement projects with proven technology.

9. NATIONAL TECHNOLOGY GUIDELINES

9.1 A broad outline of technology policy in Tanzania is still being formulated. The catalytic function of the financial institutions is to use their best evaluation and judgement of appropriate technology suitable to the country. The field of creative technology is complex and requires deeper understanding of institutionalised technology policy. The use of complicated techniques in project planning or project evaluation is no substitute for a clearly defined technology policy.

9.2 As far as the country is concerned, there are two basic problems in technology evaluation or choice. First, the problem of evaluating and upgrading traditional technology. The second is the problem of adapting and improving modern technology to suit local conditions. Both the Tanzania Industrial Studies and Consulting Organisation and the Tanzania Industrial Research Development Organisation are still developing manpower and experience to undertake the above tasks.

9.3 As a country, therefore, the institutions which have been established under the respective sectoral ministries are intended to tackle the problems of:-

- technological choice
- technology adaptation
- upgrading of indigenous technology
- identification of technological problems and solutions
- technology intelligence

9.4 The important point to realise, however, is that a beginning has been made. There are a number of institutions which provide technology information on industrial projects. These are:-

- Industrial Studies and Consulting Organisation
- Tanzania Industrial Research and Development and
- National Scientific and Research Council
- Tanzania Agricultural Machinery Testing Unit
- Tanzania Engineering and Manufacturing
- Design Organisation
- General Agricultural Researchs Organisation
- Forestry Research Institute
- Fishery Research Institute
- The Institute of Production Innovation
- National Food and Nutrition Centre

9.5 Apart from these institutions, the common practice in the country is to contact external technology organisations like the UNIDO Technical Services Unit, Institutes of Appropriate Technology in the U.K., the U.S.A. and other United Nations agencies.

10. FINANCIAL INSTITUTION AND TECHNOLOGY POLICY

10.1 The financial system as indicated in this paper covers the whole spectrum of activities in the country. The system interlocks with the processes and patterns of resource mobilisation, allocation and use of scarce resources by the sectoral production and service sectors.

10.2 Following the general framework of the intitutional structure in Tanzania, there is still a need to develop an institutionalised technology policy, which would provide guidance to project planning or project evaluation. Both of them are useless without such a policy which is basic in dealing with problems of technology absorption and diffusion.

11. INVESTMENT EVALUATION

11.1 The basic problem in investment and technology evaluation is to determine a synthetic formula for effectiveness. Impact of realization of a given project is normally transmitted in a number of ways to the national income and its branch structure. It involves selection of appropriate technology and the distribution of income between many different kinds of sector breakdown of the economy, though the basic ones are: the producing sector, the consuming sector, and the government sector. In the light of these essential effects it is not possible to establish one single index for comprehensive evaluation and appraisal of the project's economic efficiency.

11.2 From the foregoing, it is natural therefore that decision choice and evaluation criteria by the financial institutions has to be made in relation to pre-determined objectives to be attained at enterprise and at national levels. Identification of major effects relevant to the attainment of the strategy provide a basis for investment decision. This means that clarity of objectives, knowledge of technology policy, availability of information, data and analysis of options are all essential for decision making processes.

11.3 The common technology evaluation criteria used by Banks providing industrial finance in Tanzania are:

11.4 Resource - Oriented Criteria: The optimal method of generating additions to stocks and flows of scarce resources - savings, foreign exchange and pool of efficient labour is by careful application of existing supplies of scarce resources to utilization of technologies which are economically and technically sound. Experience by banks shows that determination of economic soundness is, in practice, not an easy thing since the future techno-economic parameters and particulary those new plants are rather fluid and difficult to forecast.

11.5 Growth - Oriented Criteria: Both the Tanzania Investment Bank and the Tanganyika Development Finance Company stress on the importance of the criterion which tends to maximize economic growth through the choice of technology with lowest possible capital intensity. The significance of this criterion is the attainment of long-term effect that the economy would be able to generate investible surplus to enable it to build up a great more plants which would create more employment in the industrial sector.

11.6 As remarked earlier, banks are never involved at the design and engineering stages of any plant. The basic role of the banks is therefore to influence indirectly the selection of appropriate technology which conforms to the national goals by either accepting or rejecting financing a project.

11.7 Employment - Oriented Criteria: The focus by the Banks on use of local labour skills is to avoid the temptation of employing modern technologies which do not help to reduce the problem of unemployment particulary in the rural areas. The evaluation of the effectiveness of this criterion normally requires a number of options, concerning choice of technology, training of technical personnel and involvement of designers and suppliers of plants for capital saving technology.

11.8 Effeciency - Oriented Criterion: With regard to a decision on two or more technology alternatives, it is customary to use the domestic resource cost per unit comparison. The current experience of banks is that there are normally computational difficulties particulary with respect to the selection of C.I.F. price for comparison.

11.9 Technology evaluation is a major responsibility of all the economic sectoral ministries with the participation of the other relevant institutions and enterprises. The banks are brought in many times to assist in evaluating the feasibility of the projects not only in terms of financial profitability but also in terms of achieving the country's national objectives. Thus, the focus of the banks in technical evaluation is to ensure three things:-

- Appropriateness of the technology
- Optimum utilization of indigenous inputs
- Minimal technology complexity

12. INFORMATION REQUIRED

12.1 The role of industrial finance institutions in Tanzania in the financing of agricultural, industrial, mining projects etc can hardly be overestimated. The banks have been given the responsibility of allocating funds and to perform numerous financial extra-banking services.

12.2 It should be pointed out that the approach to technological evaluation of projects requires alot of information which is currently inadequate. For comprehensive technological evaluation of projects, financial institutions and implementing parastatals require to know the following information at various levels:

12.3 A. At National Industrial Planning Programming and Evaluation Level:

12.3.1 Macro-Planning Stage

Technological forecasting
Techno-economic analysis
Provision of technical information and data required for:-

- The preparation of national development strategy plan;
- The establishment of infrastructure & power requirements;
- Manpower development
- Other technical inputs to the development plan

12.3.2 Sectoral Planning Stage

Identification of technical information and data required for

- Establishment of sectoral priorities
- Development of a strategy for sectoral planning
- Analysis of intersectoral relationships
- Development of sources of information and data
- Proposals of goals and programmes
- Manpower requirements

12.3.3 At Project Planning Stage

Provision of technical information and data required for:-

- Identification of project options
- Selection of appropriate technology
- Selection of indigenous or foreign technology
- Development of industrial priorities
- Manpower development

12.3.4 Specific Considerations for Planning

Assessment of inputs, such as fuels, power and raw materials, trained labour, managerial talent.

Analysis of the social and economic appropriateness of technologies.

Analysis of employment opportunities, marketing, industrial production and financial implication.

Assessment of a number of auxiliary factors such as housing and health services.

12.3.5 At Project Evaluation Level

Knowledge of development of technology evaluation criteria and assessment of the relationship of the project plan to the sectoral and national development plans.

12.3.6 B. At the Initiation of Industrial Projects Level

Knowledge of formation and technical analysis of project concepts.
Identification of:-

- Processes and products for commercialization
- Technical requirements
- Functional and operational performance requirements
- Technical approaches
- Techno-economic analysis
- Operational concepts
- Market analysis
- Manpower and materials requirements
- Possible subcontracting arrangements
- Financial requirements

12.3.7 At Preliminary Selection Stage

Provision of technical information and data required for:- Deciding on alternative approaches
- Developing a systematic basis for identifying benefits and penalties of alternative approaches
- Minimizing disadvantages of alternative approach.

12.3.8 At Formulation Stage

Establishing evaluation and effectivess criteria and weighting factors
- Performing cost-benefit analysis
- Assessing alternative technologies
- Verifying the suitability of alternative technical approaches
- Identifying potential problems
- Defining future R and D needs

12.3.9 At Acquisition of Technology Stage

Provisions of technical information and data required for:-
- Negotiating joint ventures
- Negotiating technology transfer
- Evaluating tenders for joint venture

12.3.10 At Technical Evaluation and Monitoring Stage

- Technical evaluation of information of on-going production
- Analysis of market and technological trends
- Identification of new opportunities arising from market changes and new technology
- Technical information and data for assessing the short-term and long-term industrial and economic trends of the country and the changing needs of industry. 1/

12.4 Experience in Tanzania shows that both the industrial enterprises and the financing institutions lack access to basic information on alternative technologies. This frequently leads to problems of appropriate technology selection. In view of the importance of this aspect, wrong technology financing can lead to non-viability of projects and national financial and economic costs.

12.5 The present status of the technology information in Tanzania can be stated as scanty and inadequate. There is no central national information services. The information available with the technical institutions and parastatals above is difficult to reach the users. The staff working in these institutions is small in size. Expansion of highly qualified staff and facilities is limited by budgetary constraints. Most of the technical institutions in Tanzania are hardly more than ten years old. Experience is still being accumulated. Some have so far not lived to their expectations. Collaboration between existing technical institutes and the productive sectors including the financing institution have not, yet been properly organised. All these agencies operate rather indipendently.

12.6 The financial institutions mentioned above explicitly recognize the need for building up technology information units. Efforts have been taken to create nucleus technical teams to carry out technology evaluation of projects submitted for financing. They have gone further by establishing contacts with external agencies for information cross-checking. Sometimes special funds are used to finance evaluation of technical problems of external specialist agencies.

1/ For details see UNIDO paper No.ID/WG.246/6 of March 3, 1977: Utilization of National Technological Institutions in the Developing countries for Industrialisation.

12.7 Nethertheless, evaluation of technologies remains a big task for both financial institutions and implementing parastatals. Coupled with this basic issue is the problem of other equally important constraints. These are: the quality of management, labour, and the absortive capacity of sophiscated technology of the country. The availability of high-powered manpower, technical skills, the experience of work force, the capacity of financial institutions to critically evaluating technologies, the availability of research facilities and many other related elements are part of the existing gaps for inadequancy of capacity for effective technology transfer at national as well as enterprise levels.

13. TECHNOLOGY INFORMATION EXCHANGE NETWORK

13.1 Lack of access to reliable information on available and alternate technologies is a common constraint in most developing countries. The current status of technology information in Tanzania is still limited in scope.

13.2 As observed in this paper, there are several institutions in the country dealing with technology issues, but there have no central organisation which is co-ordinating their technical information. Both NIB and TDFL rely very heavily on the expertise from their in-house capacity; World Bank Technology Referral Unit; and the UNIDO Technical Information Service.

14. NEED FOR TECHNOLOGY INFORMATION SERVICE

14.1 The question of technology information service is a key element in feasibility studies. In support of this view, what is of cardinal importance is to ensure that the unit or institution catering for such service performs a number of functions such as:-

- a clearing house
- has an international information network
- accumulating general information on technology alternatives
- capable of screening technologies
- monitors the application of available technologies
- Capable of assessing status of
  - (a) technological manpower needed
  - (b) indiginous technologies
  - (c) impact of technology policies
  - (d) internal diffusion of technologies

14.2 This may require high standards of institutional capacity and resources. Perhaps such an organisation would need an international character and would involve international support through UNIDO or World Bank.

15. INDUSTRIAL AND TECHNOLOGY INFORMATION BANK

15.1 Keeping in view the significance and criticality of such a bank in assisting technology appraisal and choices and the bitter experience of developing countries in this regard, it is felt that UNIDO could make a major contributin by undertaking or commissioning the preparation (jointly with the World Bank) of INTIB. It is recognized that in undertaking such a project it would be necessary to link it with the national industrial development banks.

15.2 Having examined the present status of development of technological capabilities, and the question of investment decisions from various technological angle, it is recommended that the institutional arrangements, procedures ans systems, mechanisms of investment proposals, appraisals, decisions and implementation can strongly be conditioned by the nature of a well synchronized technological organisation, say INTIB. The basic role of INTIB should be the following:

15.3 Users-Oriented Information:

It recognised that information to be obtained from such an institution should enable the enterprises or any user of such information to make an investment decision. The quality and magnitude of decisions depend on the availability of technological information. It is necessary to view the question of information collection as a pre-requisite for the efficiency of INTIB.

15.4 Processing of Technology Information:

In view of the multiplicity of technological information the information exchange network should be of high quality. Unscreened information can be disastrous to the end-users. Evaluation of information and transmission to users is another vital role of an information exchange network organisation. In view of the proximity of the investors, development banks command an ideal position as screening agents of technologies. For example, in Tanzania this role is undertaken by TIB, THDB, TISCO, TDFL and TIRDO.

15.5 Clearing House Function

While recognising that there are several institutions in the world to-day which are involved in technology information collection and compilation, there is a need to introduce a system of proper technology identification, refining, evaluating and discarding useless information. It is necessary for the organisation to assess both the quality and usefulness of such technology information.

15.6 Source of Technology Information

The sources of technology information range from freelance consultants to technology institutions which exist in both industrialised and developing countries. It is imperative that information advice that is being given is impartial or neutral. Professionalism and ethics are vital components in information dissemination.

15.7 Dissemination of Information:

The crucial role of technology information centre is to organise utility technology information. Data collection from technology consultants need to be properly organised. Whenever necessary, clients should be free to deal with the consultants directly for specific evaluation of technologies.

15.8 Organisation of Data

In the process of data organisation and compilation, it is necessary to ensure that the system is simple. Technological data organisation should be linked with all technical services and technological sources.

15.9 Technological Enquiry System

The suitability of technological information needed would depend on a number of factors such as quality of labour, manpower availability and several other inputs. A technological enquiry system would need an application format which can be easily filled by the applicant. Two formats would be essential: an application format and a follow-up format which the client can feedback the suppliers of technological information on the success or failure of the operations. This is an essential service for improving or modifying technologies to suit specific local conditions.

15.10 Storage

This would necessitate the use of computer or other equivalent systems for filing technological information and names of leading consultants.

15.11 Communication

Speed of response of technological information to clients is very crucial. This, again, would call for application of computer system and other related facilities. For details see paper by Robert M. Steinberg. "Information System for Technology Transfer".

16. IDFI's CONTRIBUTION

16.1 As regards the specific contribution through the working relationship between the INTIB and the IDFI's, the author of this paper has the following recommendations:-

16.2 In the General Field of Industrial Technological Research

"(a) the establishment of close ties with national institutions in charge of technology (reserach institutes, documentation and technological and scientific development; public agencies in charge of this matter, etc.) with a dual purpose; first to create a regular flow of technological information; and second, to promote (through grants or special credits) the surge of an innovating national infrastructure, adjustment and technological selection.

(b) the establishment of close ties with advisory firms in the field of technology and to retain them to evaluate technological requirements and possibilities in each investment project, in order to choose within a wide range of possibilities that which best fits the parameters given in a country.

(c) activities such as the organization of scientific contents; the sponsorship of courses, seminars, conferences, etc. on specific problems that imply the search for appropriate technology.

(d) the sponsorship of practical training courses in the rural area to improve traditional technologies and the introduction of new intermediate technologies.

(e) the sponsorship of technical courses for new entrepreneurs, with the purpose of stimulating them.

(f) participation in "Multinational Technological Enterprises" suggested by the United Nations Development Program (PNUD).

16.3 <u>In the field of credit policy</u>:

(a) The explicit incorporation of considerations on technologies to employ them within evaluation criteria of projects. Toward this end the regular engagement of specialized consultant services is recommended. Elements of judgement would be both of the micro-economic type (efficiency, rentability, etc) and the macro-economic (generation of employment, optimizing use of scarce national capital investment funds) as well as the social type (decentralization, national integration, income distribution), education, cultural and ecologic. The most important criterin would have to be that of dynamic integration of maximum job opportunities by inverted monetary unit. Mainly in those development banks which finance agriculture and the small and middle enterprise and are the most propitious for developing utilization of appropriate technology, especially with regard to massive absortion of labour.

The preponderance of projects with intensive labour technology and capital savings technology for the financial development institution could report two important advantages: in the first term, many more projects could be financed with a given amount of available funds; secondly, principal recovery periods, could be substantially shorten. At the level of the individual bank, these advantages have to be made relative to the probable increase in the need of special efforts of its staff, at least in the initial stage, which would undoubtedly lead to increased costs (engagement of specialized technicians etc.)

Moreover, great efforts would have to be made to co-operate with rural co-operatives and small and middle industry already existing (and encourage the creation of new ones) as subjects of credit; the supply of a great number of adequate credits and related services to small individual producers could prove very costly.

(b) The application of interest rates reflecting the true capital scarcity and which will foster the application of less capital intensive and more labour intensive technologies. In this matter, the greatest possibilities of action and influence fall upon the central banks.

(c) The substitution, to the greatest extent, of traditional requirements, by a policy based mostly on the careful selection of new entrepreneurs and the careful selection, assistance and supervision of projects.

(d) The promotion of technological innovation at the enterprise level, for example through credits dedicated for such purposes under special conditions".2/

16.4 In the Field of International Co-operation

(a) The institutionalization of a regular flow of information through INTIB, on technologies used in project financed by the development banks with information on the application of new technologies.

(b) The periodic publication of new technological information available with INTIB.

(c) Active follow up of technological information being used and as submission of results to INTIB.

(d) Establishment of a common criteria for technology selection by all development banks.

(f) Annual meetings of DFCs organised by INTIB to discuss matters of mutual experience and to act as a contact point,

2/ See paper on "The Action of Development Banking in the Adoption of Adequate Technologies and its Effect on Employment" by General Secretariat ALIDE'S TECHNICAL PROGRAMAS DEPARTMENT April 1979.