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Fifth African-TIES Meeting

Rabat, Morocco,
23-25 September 1993

REPORT*

* Mention of firm names and commercial products does not imply the endorsement of UNIDO. This document has not been edited.

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I. INTRODUCTION

1. The Fifth African-TIES Meeting was held in Rabat, Morocco on 23 - 25 September 1993. The Meeting was organized by the United Nations Industrial Development Organization (UNIDO) in cooperation with the Centre National de Coordination et de Planification de la Recherche Scientifique et Technique (CNCPRST) and the African Regional Centre for Technology (ARCT) as part of a periodic assessment of the African-TIES network of cooperation in the area of technology acquisition and transfer.

2. Specifically, the Meeting had the following objectives:

i) To review and assess the current status of the African-TIES programme, specifically the outputs so far achieved, with particular attention to the implementation of the current project.

ii) To discuss the outputs of the inventory on technologies locally developed in the region and the intensification of efforts in Africa for transfer of technology within the countries and the region.

iii) To present and discuss emerging trends and developments in the international technology transfer and reassess the roles of institutions and the various players in the market.

iv) To review the need for training programmes and training materials aimed at building up self-sufficient capabilities in the conduct of training courses on technology negotiation and transfer.

v) To make recommendations on future directions of African-TIES including other forms of cooperation which may be pursued in the light of the changing international environment.

vi) To exchange information on national developments regarding policy, legal and institutional approaches with respect to technology acquisition and transfer.

II. ORGANIZATION OF THE MEETING

3. The Meeting was attended by twenty-one (27) participants from fourteen (14) African-TIES participating countries, consultants and staff members of UNIDO and ARCT. The list of participants is attached as Annex A.

4. Dr. Abderrahmane Zanane of Morocco and Ms. Lylie Balaka-Mahele of Cameroon were elected Chairman and Rapporteur of the Meeting, respectively.

5. The Meeting adopted the Agenda which appears as Annex B.

III. OPENING CEREMONY

6. The Meeting was declared officially open by Dr. Driss Bensari, Director of the CNCPRST. In his address, Dr. Bensari welcomed the delegates to the Meeting and underscored certain points which he felt were important for Africa. Specifically, he indicated that the meeting could reflect on policies and programmes, possibly within the African-TIES programme, that could generate links between the scientific and research community on the one hand and producers and industry on the other; and establish and promote new channels of exchange and communications particularly in the context of South-South cooperation.

7. The Chief of Technology Acquisition and Negotiation Section of UNIDO extended to the meeting best regards from the UNIDO Director-General and wishes for a successful meeting. He traced the history of the African-TIES programme highlighting the fact that the programme is built, has grown and continues to exhibit potential for further development, on the basis of a clear identification, rational elaboration and thorough distillation of issues, problems and needs of countries in the region, a process undertaken jointly and collectively by the participating countries themselves. This process has definitely enhanced UNIDO's response to the totality of needs of the region, which is being constantly finetuned in accordance with new and changing requirements.

8. He underscored the fact that the meeting takes place at a time when the global environment for international technology transfer is undergoing dramatic changes with threats of diminishing access to technologies by developing countries as well as increasing acquisition costs. The building of institutional and professional capacities to select, evaluate, negotiate and effectively absorb technologies, increased awareness of issues and problems and access to information are necessary ingredients for developing countries to face the challenges brought about by these developments. The role of regional cooperation in this context is extremely important. The meeting may therefore review and analyze what new initiatives the African-TIES programme could pursue in response to the changing needs of the region as influenced by global developments.

9. Mr. Michael Nageri, on behalf of ARCT, expressed the view that technology-related programmes and undertakings continue to be crucial to Africa. There is the urgent need to improve productivity, expand the range of alternatives and choice for technology users and facilitate the acquisition process. He emphasized that small and medium enterprises (SMEs) in particular, need support of this nature. He further suggested that case studies be undertaken which would document experiences with particular technologies which have been successfully adapted and assimilated in Africa, indicating the patterns and modes of access and transfer and the accountable success factors. These success stories could be disseminated as examples of technology transfer and acquisition from which African firms and entrepreneurs could draw good lessons from.

IV. GLOBAL ISSUES CONCERNING TECHNOLOGY TRANSFER AND DEVELOPMENT

10. Dr. Carlos Correa, consultant of UNIDO, presented his paper on "Prospects and New Dimensions on International Technology Transfer". The paper discusses the current trends and developments which are considered to be influencing the patterns of technology transfer to developing countries. He stressed that there is now a deep asymmetry between developed and developing countries in terms of their participation and contribution to worldwide R & D and innovation, specifically a high concentration in the developed economies. Developed countries are paying a lot of attention to developing and controlling technology as indicated by the following:

- substantial increase in intangible investments, i.e., other investments linked to technological capabilities such as training, organization, market exploration, information technology, in OECD countries.
- increasing R & D activities during the '80s despite the recession, with the growing participation of private enterprises in OECD countries, which is quite different from developing countries where R & D is performed by the State.
- the ongoing reenforcement of the international intellectual property system which is a component of the emerging technological protectionism among the industrialized countries. Two developments noted were: first, the strong demand by developed countries for the reform of the intellectual property system particularly in developing countries, e.g., protection of software, computer programs, pharmaceutical; and second, the negotiations in GATT for an Agreement on Trade-related Intellectual Property System (TRIPS) which will set universal standards for the protection of intellectual property independent of the state of development of countries.

11. The globalization of the world economy, the opening up of economies in developing countries and the increasing privatization of knowledge will have significant effects on the supply and demand for technology. On the supply side, firms which own technology will be more hesitant to transfer technology because of fear of creating competitors in a globalized market and also because given the liberal reforms in developing countries, owners need not invest or license to penetrate protected markets but instead may use trade. It is likely that the price of technology will increase. On the demand side, technology acquirers which traditionally can compensate for higher costs by working in protected markets are now operating in an environment where they have to compete with foreign companies in the domestic market. They will therefore need to become more efficient in the selection, use and assimilation of technology.

12. Given these developments in the international scenario for technology transfer, the process of formulation of technology transfer and development policy should take into account the following:

- an adaption-oriented technology policy which emphasizes absorption of foreign technology rather than creation of new technology as in the examples of the Republic of Korea and Japan. Here, the involvement of the private sector is crucial.

- less attention to channels which is not as relevant in connection with impact on technological capability and more attention to the kind and orientation of domestic effort to take knowledge and develop local capabilities.

- focus on improving capacity to select and negotiate technology in the light of the expected difficulties in obtaining technology.

- increased efforts to integrate importation with domestic technological efforts.

V. TECHNOLOGY TRANSFER AND DEVELOPMENT IN AFRICA: TRENDS AND ISSUES

13. Mr. Fred Okono, delegate from Nigeria, presented his paper on "Technology Transfer and Development in Africa: Trends and Issues". In describing the macrocconomic picture of technology flows to Africa, he emphasized that Africa like other developing continents of the world, has been susceptible to the very imperfect nature of the market under which technology is sold and purchased. In the attempt to develop and modernize, the continent had fallen prey to the exploitation of technologically advanced countries which sold all kinds of technology including obsolete ones to African entrepreneurs at exorbitant prices, solely determined in a majority of cases by the technology suppliers themselves. Monopolistic pricing and restrictive business practices ranging from export restrictions, discriminatory royalty rates, excessively long duration coupled with tie-in clauses were common. In addition, details of technology to be acquired are in most cases not properly stipulated nor are product quantity, quality and standards and guarantee and warranty provisions.

14. In general, the problems are a result of a combination of institutional, enterprise and professional insufficiencies and weaknesses, i.e., in evaluating and selecting technologies; in negotiating, and unpackaging technologies; in adapting, absorbing and diffusing; and at the policy level the lack of a well defined science and technology policy. Consequently, it may be said that the principal motive for government intervention has not ceased to exist. However, a shift in orientation may be appropriate, i.e., from regulatory activities to various advisory and assistance measures aimed at strengthening managerial capabilities and negotiating skills of local entrepreneurs; from comprehensive and costly bureaucratic procedures towards more efficient forms of government involvement; and "optimum", rather than maximum involvement in decision-making processes.

15. Furthermore, certain policy and structural reforms have been suggested in the form of programmes for: i) the development of indigenous technological capabilities; ii) the establishment of a national science and technology fund financing through contributions by the public and private sectors; iii) rationalization of existing research institutions in Africa to make them more relevant to the economic and technological needs of their countries; iv) the establishment of regulatory agencies to set up "positive" standards or guidelines for research, selection, unpackaging, training and R & D facilities by local enterprises; and v) the development of active technology transfer strategy in line with the broader development and micro-economic policy framework.

VI. COUNTRY UPDATES

16. In line with the regular updating and exchange of information under the African-TIES programme, delegates from African-TIES participating institutions presented reports on current policy and institutional frameworks relating to technology transfer and development in their respective countries. The country reports appear as Annexes C to N.

17. The ARCT representative likewise presented to the Meeting ARCT's ongoing programmes and activities which countries in the region may participate in and benefit from. The report appears as Annex O.

VII. AN OVERVIEW OF THE AFRICAN-TIES PROGRAMME

18. A report was presented on the African-TIES programme, its current status particularly in terms of implementation of programme components, i.e., human resource development; exchange of information, staff training and exchanges; the preparation of working materials on technology acquisition and negotiation; and advisory services on issues of policy, policy instruments and the selection, evaluation and negotiation of technology transfer, and production of outputs. The expansion of the programme in terms of membership and its qualitative growth as measured from the intensity and depth of activities being implemented were highlighted such that the programme has proven to be a viable instrument for harnessing the regional cooperative spirit in addressing issues of technology acquisition and transfer and where the opportunity for dialogue and professional interaction and for cooperative, synergistic undertakings, have been extremely useful.

19. The human resource component consisting of workshops and training seminars on technology transfer contracting and negotiation has benefitted fourteen countries (Cameroon, Congo, Egypt, Ethiopia, Ghana, Guinea, Madagascar, Mali, Morocco, Nigeria, Rwanda, Senegal, Tanzania, Tunisia) and over 500 officials, entrepreneurs and professionals who participated in the training workshops/seminars. In 1990, this component took a qualitative step forward with the introduction

of the concept of training of trainers, that is, the creation of national/regional training capabilities in the field of technology transfer negotiation with the long term view of institutionalized, self-sufficient training of national negotiators by national experts. The process is carried out through the creation of national/regional core teams of trainers preferably within an institution and the exposure and training of these teams to a teaching methodology and content as documented in the Manual on Technology Transfer Negotiations of UNIDO.

20. Staff training and exchanges among the African-TIES focal point institutions are a means of exposing officials of these organizations to the institutional approaches and substantive content of technology evaluation and technology transfer promotion as they are being carried out by existing technology transfer offices. This is a practical-oriented approach which provides insights into alternative institutional, administrative and practical approaches in the selection, evaluation and negotiation of technology transfer agreements. The National Office for Technology Promotion and Acquisition (NOTAP) of Nigeria and the General Organization for Industrialization (GOFI) of Egypt have trained government officers from Cameroon, Ethiopia, Ghana, Kenya, Tunisia, Togo and Sudan on these aspects.

21. The exchange of information has been the traditional component of African-TIES, with information ranging from policy and institutional approaches to practical experiences in technology acquisition and negotiation; terms and conditions of acquisition; evaluation standards and parameters; and experiences at the national scale containing assessments of technology transfer trends and flows. An attempt to document this exchange has produced The African-TIES Guide, which was presented at the Meeting as Working Paper No. 6. The Guide is a documentation of the policies and pronouncements, legal and administrative frameworks and institutional set-ups of selected African-TIES member countries in the field of technology transfer and related areas such as investments. It also contains selected country expositions on experiences and issues confronting both policy-makers and practitioners in the area of technology acquisition and negotiation. This Material could provide very valuable information to policy-makers, researchers and businessmen who need current and updated information on the legal and institutional environment for technology transfer and related fields in Africa. While presently containing information on six countries only, subsequent releases may be made according to availability of new information.

22. Still in the area of exchange of information, an effort was made on a pilot scale to undertake a survey of locally developed technologies in five African-TIES countries, i.e., Cameroon, Ghana, Kenya, Nigeria and Tanzania. The idea was to fill in the perceived lack of information on what the region can in fact offer in terms of indigenous technologies; and subsequently, to move a step

forward by exploring possibilities of technology sharing and exchange. This initiative was taken as a result of discussions which took place at the Fourth African-TIES meeting in October 1991.

23. With the expert assistance from five national experts, Working Paper No. 5 entitled Survey of African-Technologies was produced. Initially focussing on three sub-sectors deemed to be most important to Africa, i.e., food processing, agricultural machinery and water resource technology, an inventory and stock-taking of indigenous technology was undertaken on the basis of a standard format containing what are considered as basic information needed to arouse the interest of potential users and to make a preliminary judgement on whether the technology is worth exploring for commercial purposes. It was emphasized that possible follow-up action to this pilot survey would depend on the kind and quality of reaction received particularly from potential users.

24. Several working materials of worth were produced under the programme of which two of the most important are the Guide to Negotiators of Technology Transfer in the African Region with special focus on the agro and agro-related sectors; and the Technology Transfer Manual for Research Institutes in Developing Countries. The first material is intended as a working tool for negotiators dealing with agro and food industry technologies and covers the relevant aspects of the technology transfer cycle from bidding to contracting specifically taking into account the particular problems and peculiarities of the agro and agro-based sectors. The second material is intended to complement the survey of indigenous technologies which partly drew information from R & D institutions in Africa. The manual is meant to create awareness among personnel of these institutions on the commercial opportunities behind their efforts and the strategies they could employ to bring R & D results to the marketplace.

25. The programme likewise has a facility for responding to the needs and requests of an immediate nature either on issues of technology transfer policy as was the case of an advisory mission sent to Guinea or on issues of technology selection, evaluation and negotiation which are being responded to during one-on-one consultations held in conjunction with the training seminars/workshops on contracting and negotiation.

VIII. PROPOSED CONCEPT OF TECHNOLOGY SHARING AND EXCHANGE

26. Dr. Leon V. Chico, UNIDO Consultant, presented to the Meeting a proposed concept for technology sharing and exchange of which the inventory of indigenous technologies would become an important component. He underscored some guiding principles taken from the experiences in operating similar networks in Asia particularly the Technonet Asia, Approtech Asia and the Asia Pacific Centre for Technology Transfer, which are also relevant in the context of an African-TIES network of technology sharing and exchange. These principles are sustainability and "self-reliance",

which he emphasized are critical to continued support of such undertakings by donor agencies; the ability to act as an independent organization rather than as a loose and voluntary network of institutions; the commitment of participating organizations; the critical role of the regional focal point which should be able to take initiatives and effectively implement policies and programmes; and active links with national, regional and international networks.

27. A "total" approach to technology sharing and exchange showing the various parties involved, the process flow and some of the important activities necessary is shown in Annex P. The institutions that are expected to be involved and their respective roles are:

- National Participating Organization (NPO) - the national focal point which will be responsible for the actual generation and provision of information to the system, disseminati on of information on technologies available from other countries, networking with local coo perating institutions especially in the determination of technology needs of target industries and in the provision of assistance that may be required in the technology transfer process. The NPO should take a proactive role particularly in assisting SMEs.
- Regional Centre - this will act as the central data and information base and will organize, process, package and systematically disseminate accumulated information to NPOs.
- Local Cooperating Institutions (LCO) - will consist of a variety of institutions which are the sources of locally developed or adapted technologies, technical information and extension services to industry, and those who can assist in the negotiation and contracting or in the adaptation of technology.
- International Cooperating Organizations (ICO) - may be the source of information on technologies developed and adapted in other countries which may be applicable to Africa and be able to provide assistance to the network as necessary.

IX. THE UNIDO TRAINING PROGRAMME ON TECHNOLOGY CONTRACTING AND NEGOTIATION

28. The Meeting was briefed about the UNIDO training programme on technology contracting and negotiation which consists of a very important component of the UNIDO technology acquisition programme. On request of governments, workshops and courses for government officials, entrepreneurs and professionals responsible for conducting technology transfer negotiations or evaluating technology transfer agreements are organized by UNIDO. The objective is to create in developing country negotiators the awareness on the range of issues that they will be confronted with in the process of contracting and negotiating technology transfers; and at the same time imbibe certain basic principles and guidelines that will assist in securing the best possible terms and

conditions including conditions that will create an environment for technology absorption and innovation to take place. The UNIDO package of services is considered unique and distinct because of the following:

- UNIDO has been conducting workshops on technology transfer for many years and has accumulated not only in-depth experience but also an astute understanding of the situations and needs of developing countries in general. This in itself is a knowhow. Requests are received and evaluated on the basis of an assessment of the gap that needs to be filled at that particular instance. This knowhow, including the knowledge that goes with it, has been very useful in the design of workshop programmes; in providing focus where appropriate; and also very useful as it provides perspectives which span many regions and many countries.

- The Manual on Technology Transfer Negotiations consolidates in an innovative way UNIDO's comprehensive knowledge and experience in the training of technology transfer negotiators. Consisting of twenty-one modules grouped around thematic clusters surrounding the technology acquisition process, it is supplemented by a collection of standard and normative documents including a glossary of terms, a trainer's set with instructions and notes for trainers and case studies. In its entirety, the Manual is the instrument with which UNIDO is able to organize its capacity-building activities with more focus, develop its programme for training trainers and enable institutions in developing countries to conduct their own training programmes on the basis of UNIDO's methodologies and standards. The Manual which is soon to be finalized covers in a comprehensive manner the range of subjects that entrepreneurs, decision-makers and government officials dealing with technology acquisition are likely to be confronted with along the technology transfer process. These subjects may be divided under four major headings: general aspects of transfer of technology consisting of modules on technology transfer and development, technology market characteristics, the role of intellectual property protection and success factors for transfer of technology; the transfer of technology environment with modules on the legal environment in industrialized countries, the legal environment in developing countries, financing sources, sources of information, technology evaluation, bidding and procurement, dynamics of the negotiation process; contracting with modules ont the basic legal notions in technology transfer, principles of contract drafting, general structure and types of contracts, technology package and contractual options, training, payments, guarantees/warranties; and complex technology transfer forms with modules on strategic partnering and joint ventures.

- The Manual itself has a special purpose. It is an important element to achieving UNIDO's objective of creating self-sufficient capabilities in developing countries to run similar courses at the

national level. It contains a teaching methodology and tools for teaching not only negotiators but trainers of negotiators as well

X. DISCUSSIONS:

29 Hereunder is a summary of the discussions which took place during the three-day Meeting:

30. It is now not relevant to talk about technology transfer without talking about strengthening domestic technological capabilities. The latter is essential for the efficient import of technology, that is, to enable understanding of the technology, adaptation to local conditions, resources and objectives and improvement to keep pace with world competition. This involves attention to indigenous R&D and the strengthening of science and technology systems. This also involves commitment to education and training. Programmes that generates links between industry and the scientific community; that would research on the needs of entrepreneurs as far as building up absorptive capacities; that would reorient the system of education are therefore useful. Countries in Africa are recognizing the importance of these elements. Tunisia has adopted a long-term strategy for mastery of technology. Sudan is in the process of introducing a system of education of engineers oriented towards maintenance and repair rather than design. Nigeria is moving towards greater integration of technology transfer policy with S & T policy.

31. Rather than intervention, some delegates expressed the view that support and service-orientation should be the thrust of institutions. While the opening up of economies has led to the easing up of regulations and control over technology transfer, problems of access particularly where strategic technologies are concerned; acquisition of technologies which are not sustainable; lack of negotiation capability and skills; and inefficient use remain as problems to contend with. Institutions should be able to support and provide assistance on these aspects particularly to small and medium enterprises who, because of resource constraints, have little access to information and expertise. In Senegal, such capabilities are being developed through a UNIDO project of assistance which involves capability-building in rendering advisory support, consultancy services and training of negotiators. Egypt has also reoriented its policies and institution from mandatory registration through the General Organization for Industrialization (GOFI) to the extension of consultancy services to industry in the areas of choice, selection, evaluating technology, in contract drafting and negotiation and in preparing to receive the technology. A similar shift in emphasis towards assisting the business sector was also noted in Ghana. The fear was however expressed that the opening up of economies and the emerging strategy to attract foreign investments without any control may eventually lead to foreign investors taking over many areas of business activities to the detriment of nationals. This is another angle which policy-makers need to be alerted to.

32. In terms of policy, it also becomes difficult to discuss technology transfer policy in isolation from technology development policy, investments policy and national industrial and economic policies. As indicated, indigenous R & D and the import of technology are not alternative modes of technical advance but mutually supportive complementary activities. As shown by the experience of the Newly Industrializing Countries (NICs), successful industrialization depends on a combination of imports of technology and indigenous S & T activities with a major commitment to education and training. A technology transfer and development policy should take these basic elements into account. In the region, a few countries have taken steps towards this direction for instance, Uganda, whose political leadership has recognized that the state of preparedness to absorb and assimilate technology is important for successful technology transfer and is showing a very high commitment to a science and technology based development.

33. The Meeting noted that significant outputs have been achieved under the African-TIES programme and expressed satisfaction with the efforts of UNIDO and ARCT not only to sustain and to institute qualitative improvements in outputs, activities and outreach. While new requirements have arisen and will continue to arise due to the constantly changing global environment, the existing programme component consisting of exchange of information, human resource development, advisory services continue to be valid and relevant. It is perhaps in the nature and scope of these programme components that some fresh ideas have to be introduced.

34. Exchange of information particularly through the institutional linkages should be pursued under the African-TIES programme. Some participants expressed the view that information on contractual terms and conditions continue to be essential. At the same time, new areas of information exchange may be explored, for instance, information on existing R & D institutes in Africa and the results of their R & D activities; information on locally developed and/or adapted technologies which may be shared and exchanged. However, there is an urgent need to establish in some countries and strengthen in others, the networking of national institutions in order that information received from international or regional networks trickle down to all potential users of such information at the national level. As far as African-TIES activities are concerned, the identification of appropriate focal points should be given thorough and careful consideration both by UNIDO and national designating authorities. Focal point institutions on the other hand should endeavor to make dedicated efforts at submitting information to the system while ARCT and UNIDO should mobilize resources to support African-TIES focal point institutions in their efforts to disseminate information nationally. For instance, the ARCT electronic mail networking may be expanded to include the African-TIES networking.

35. This is an issue of crucial importance to maintaining sustainability of the African-TIES programme in general and to operationalizing the concept of technology sharing and exchange as presented at the meeting. Activating the network may be in accordance with the following plan of action:

- Identifying participating institutions in each African-TIES participating country which will become part of the regional network;
- Explicit agreement by the identified organization to participate in the project with the following obligations:
- designate an officer to be the focal point of its activities;
- periodically submit indigenous or adapted technologies that may be available for sharing and exchange;
- propagate to its constituency, technologies from other countries that are available for sharing and exchange;
- assist the enterprises concerned in the management of the technology transfer/exchange process;
- respond to enquiries from participating organizations in other countries.
- Based on the national surveys conducted, an initial data base of technologies available form sharing and exchanges should be properly packaged and disseminated to all participating institutions. Updates should also be disseminated periodically.
- Arrangements for accessing appropriate technologies from other international, regional and national sources should be initiated by ARCT/UNIDO.

The Meeting also expressed the desire to expand the survey to other countries in the region. In the meantime, it was suggested that the preliminary results of the survey be made available to potential users in the respective countries be they government institutions extending services and assistance to entrepreneurs, industrial organizations and chambers of commerce and industry, universities, R&D institutes or professional organizations.

36. Opportunities to discuss and analyze issues of transfer of technology in Africa, such as that presented by regional African-TIES gatherings fulfil an important role in sensitizing policy-makers and future policy-makers in the region. They also provide a good forum for exchanging information on country experiences and approaches by way of policy and institutional mechanisms in dealing with technology acquisition.

37. A number of delegates expressed very positive views about UNIDO's capability building programme for technology transfer negotiators indicating the strong need for awareness building and strengthening of acquisition and negotiation capabilities by countries in the region particularly in

the light of the easing up of regulations concerning technology importation in some countries. The meeting agreed that the process involves a capacity build-up which requires a sustained approach. Thus, follow-up activities such as through upgraded workshops, complementary training of personnel of technical centers and R & D institutes on issues of technology acquisition and negotiation; and effective dissemination of working materials to targeted users should be embarked on. The Manual on Technology Transfer Negotiations was also viewed as a very professionally executed complement to the capability-building programme and translation to French was suggested in order that the French-speaking African countries may likewise benefit fully from this material. Cameroon, Uganda, Sudan specifically indicated their interest for national programmes.

XI. CONCLUSIONS AND RECOMMENDATIONS:

38. The following conclusions and recommendations were adopted by the Meeting:

39. As has been the experience in previous meetings, the presentations on country experiences both with respect to the developments on institutional, legal and administrative approaches to technology transfer and development and on the issues, particularly difficulties, confronting African countries in the process of acquiring technology was an enlightening and useful exercise. The liberalization, and dismantling in certain cases of foreign investment and technology transfer rules and regulations either as a result of pressure from creditors or as part of a strategy to attract foreign investments, was observed as an emerging trend in many countries in Africa. This has consequently led to a change in the complexion of institutions involved with technology acquisition, a kind of an "enlightened" and "user-friendly" approach which is oriented more on promotional and advisory services than regulatory.

40. Furthermore, there now exists a deep asymmetry between the developed and developing countries in terms of their participation and contribution to worldwide R & D and technological activities. The globalization of technology, the increasing privatization of knowledge, the growing technological protectionism on the part of the developed countries, the emergence of new technologies and the rise of strategic technology alliances primarily among developed country firms represent threats of diminishing access to technologies by developing countries as well of increasing costs.

41. The above developments make more imperative the need to have a clear technology transfer and development policy that will facilitate the access to and mastery of technologies; create an environment conducive to technology absorption and innovation; and promote a more efficient process of selecting, acquiring, negotiating and assimilating transferred technologies. Such a policy should be adequately integrated with investment policies taking into account the changes brought

about by the globalization of the world economy. Based on the experience of the Newly Industrializing Countries (NICs), the presence of a strong domestic technological base with capabilities for innovation is a significant factor which attracts foreign investment flows to a country. In this connection, attention should be given to mobilizing local research and development facilities for technology development and for establishing linkages with the other components in the technology system, for instance, the users of technology.

42. Institutional responses continue to be required such as in the form of capacity-building or advisory assistance. For instance, institutional monitoring of inflow of technologies to ensure that they are not contributing to the degradation of the environment is one area of crucial importance. Advisory assistance in contract negotiation and implementation is another area of need. Access to information is still another. Special attention should also be given to the needs of the small and medium industry (SMIs) sectors of Africa in the area of technology choice, selection, evaluation and negotiation. These sectors have the greatest demand for advisory services in these fields in view of their inherent structural weaknesses and resource constraints.

43. The meeting recognized the need for institutions in Africa to continue the exchange of information not only at the regional scale but at the national level as well. For this purpose, the importance of networking at the national level was underscored as an avenue for building awareness on the information available as well as the sources of information existing within a given country. This means for example, the linking of African-TIES institutions with other institutions in the country engaged in technology transfer and development related work and more importantly with actual and potential users of technologies and the setting up of mechanisms for exchange of information, e.g., newsletters, technobriefs, technology exhibits and fairs, etc. The aim is to create synergy from the diversified efforts of the various components of the technology system. Such an approach would erase duplication and greatly enrich the exchange of information at the regional level.

44. The African-TIES programme should also re-activate its links with the global TIES for a broader access to information.

45. The private or entrepreneurial sector, as the ultimate users of technologies, is another important component of the technology system with which systematic links should be established. Effective collaboration with these associations should be set up as they could provide a useful platform for delivery of services by African-TIES institutions in the areas of technology information, training activities and advisory services on a self-sustaining basis.

46. As regards the survey of technologies which was started on a pilot scale in five countries in Africa, the meeting noted that this survey should be extended to other African countries while at

the same time being continued in those countries which participated in the pilot project. The results of the initial survey should be propagated by the African-TIES institutions to potential users in their respective countries and by the ARCT through its various information dissemination mechanisms. The same approach will be taken by UNIDO particularly through the TIES Newsletter.

47. On the other hand, the meeting recognized that efforts should be made at the national level to activate the network for sharing and exchange of indigenous or adapted technologies on the basis of the concept formulated by the UNIDO consultant. This involves the identification of National Participating Organizations (NPOs) in each African-TIES country and the identification of other national organizations which will act as local cooperating organizations; agreement in principle by the identified organizations to participate in the project including the designation of focal point officers, periodic submission of indigenous or adapted technologies which may be available for sharing and exchange, propagation of such technologies to its constituencies and response to inquiries from other NPOs in other countries; packaging and dissemination of initial inventory of technologies available for sharing and exchange; and accessing appropriate technologies from other regional, international and national sources by UNIDO and ARCT.

48. The Meeting expressed appreciation to UNIDO and ARCT for the extensive work undertaken the field of regional and national capability-building in technology transfer negotiations under the African-TIES programme. This partnership must continue to be cultivated and strengthened in order that the programme could achieve new heights and respond to the changing needs and requirements of countries in Africa.

49. The programme has produced noteworthy outputs, specifically a) the training of officials, entrepreneurs and practitioners from at least fourteen countries in Africa which is now based on the concept of creating self-sufficiency in the conduct of national courses on technology transfer negotiations. The programme has been highly instrumental in the preparation of the Manual on Technology Transfer Negotiations being used in such training courses; b) the African TIES Guide representing a documentation of the exchange of information on policy, institutional and legislative approaches by countries in the region in the field of technology transfer and related areas; c) a pilot survey of indigenous or locally adapted technologies in five countries in Africa; d) a concept for technology sharing and exchange in Africa which could be immediately made operational; e) trained staff and officials of technology transfer or related institutions on the operational and substantive aspects of technology transfer offices; f) a Technology Transfer Manual for research institutes in developing countries; g) a Guide to Negotiators of Technology Transfer in the African Region with a special focus on the agro- and agro-related sectors; and policy advise both on policy and specific practical issues of technology transfer transactions.

50. It was recognized that the changing global environment which would necessitate appropriate policy and institutional responses particularly at the national level will require external support and assistance. The Meeting therefore called on UNIDO and ARCT to further intensify its efforts aimed at facilitating access to technologies, with special attention to environmentally-sound technologies, and building capacities in the field of technology access, acquisition and negotiation. In this connection, a country-specific approach should be taken based on a thorough assessment of specific needs and local demand. In addition, long-term sustainability of follow-up programme or action should be an overriding consideration.

XII. CLOSING OF THE MEETING

51. The delegates expressed their appreciation to the Government of Morocco and to the officers and staff of CNCPRST for the excellent arrangements made for the meeting.

The Meeting was declared adjourned by the Chairman and Secretary-General of CNCPRST.

Annex A

List of participants

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UNIDO Consultant

26. Dr. Leon Chico
c/o UNIDO

27. Mr. Carlos Correa
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ANNEX B

UNIDO ONUDI

UNITED NATIONS INDUSTRIAL DEVELOPMENT ORGANIZATION
ORGANISATION DES NATIONS UNIES POUR LE DEVELOPPEMENT INDUSTRIEL

FIFTH AFRICAN-TIES MEETING

23 - 25 September 1993
Rabat, Morocco

AGENDA

I. Opening of the Meeting

II. Election of the Chairperson

III. Adoption of the Agenda

IV. Discussion of Global Issues concerning Technology Transfer and Development

V. Presentation and discussion of paper on Technology Transfer and Development in Africa: Trends and Issues

VI. Country updates

VII. Report on status of African-TIES programme
A. Results of technology survey
B. The African-TIES Guide
C. The Technology Transfer Manual: A guide for R & D institutes in the commercialization of R & D results through contracting

VIII. Presentation and discussion of proposed concept for technology sharing and exchange

IX. The UNIDO training programme on technology contracting and negotiation

X. Prospects of regional cooperation in the field of technology acquisition and negotiation in Africa: Future directions of African-TIES

XI. Consideration and adoption of the report of the meeting

ANNEX C

COUNTRY REPORT - CAMEROON

Policy and Institutional Framework on Technology Transfer and Development

Ms. Lylie Balaka-Mahele
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MINISTERE DU DEVELOPPEMENT
INDUSTRIEL ET COMMERCIAL

DIRECTION DE L'INDUSTRIE

REPUBLIQUE DU CAMEROUN
Paix - Travail - Patrie

YAOUNDE, le _____

N°_____/MINDIC/DI/SDPI/CEA4

RAPPORT SUR L'EVOLUTION DU PROJET TIES AU CAMEROUN

Présenté par Mademoiselle BALAKA MAHELE Lylie, Chargée d'Etudes Assistant et point focal du projet TIES au Ministère du Développement Industriel et Commercial
A LA REUNION DE SEPTEMBRE 1993 A RABAT AU MAROC

La technologie joue un rôle primordial dans le développement socio-économique des pays, mais la complexité des problèmes auxquels se heurtent le choix, l'évaluation, la négociation ainsi que les difficultés rencontrées pour le transfert de technologie sont à tenir en compte.

L'expérience ayant montré que la maîtrise d'une technologie dépendait de la manière dont a été négocié son transfert, il est important qu'une attention particulière soit portée sur la négociation et l'élaboration des contrats de transfert de technologie.

Au Cameroun, il n'existe pas encore de structure qui s'occupe de l'enregistrement, de l'acquisition, de l'évaluation et de la promotion de la technologie. Mais l'on trouve des sources d'information industrielle et technologique au :

1°) Ministère de la Recherche Scientifique et Technique qui couronne tous les instituts de Recherche au sein du Comité National du Développement Technologique (le CNDT). En fait le CNDT dont un projet de texte tendant à la réorganisation est en cours aura des missions suivantes :

* Valorisation des résultats de recherches
* mise en place des normes
* le Développement technologique.

.../...

2°) (L'OAPI) L'ORGANISATION AFRICAINE DE LA PROPRIETE INTELLECTUELLE qui est un organisme international qui regroupe 14 pays d'Afrique Francophone.

Il n'existe pas de législation spécifique au Cameroun en matière de propriété intellectuelle. Le système en vigueur est celui relatif à l'Accord de BANGUI. Son but est la protection des inventions et des oeuvres de l'esprit par la délivrance des titres de propriété industrielle (Brevet, Marques, Dessins et Modèles et Droits d'auteurs).

3°) LE MINISTERE DU DEVELOPPEMENT INDUSTRIEL ET COMMERCIAL qui a en son sein un service de l'information industrielle doté du logiciel INTIB. L'apport du logiciel systéme CORIS qui permettra l'enregistrement est largement souhaité.

Ce Ministère qui est en contact et qui règlémente toutes les activités industrielles et commerciales utilise :

a) Le Code des Investissements:

Institué par l'ordonnance du 8 Novembre 1990, ce code vise à encourager la création et le développement des activités économiques orientées vers:

- la valorisation prioritaire des ressources naturelles nationales
- la création d'emplois nouveaux
- la production des biens et services compétitifs pour la consommation interne et à l'exportation
- l'accroissement des exportations des produits manufacturés
- le transfert et l'adoption de technologies appropriées.

L'entreprise jouissant du régime de l'Agrémentà ce code bénéficie de divers avantages fiscaux et est exonorée du paiement des droits et taxes d'importation pratiquement sur tout ce qu'elle importe et qui entre d'une façon ou d'une autre dans ses activités de production.

b) Le Plan Directeur d'Industrialisation (PDI)

Le PDI est un plan pluriannel qui définit les grands objectifs nationaux d'industrialisation et les stratégies industrielles pour atteindre ces objectifs qui sont :

- maîtrise des nouvelles technologies
- modernisation des unités industrielles existantes

.../...

- mise en place des mécanismes incitatifs pour encourager l'investissement industriel et l'innovation technologique
- mise en place des circuits d'information scientifique et technique.

4°) La Règlementation sur les marchés publics

Elle concerne les contrats par lesquels une personne de droit public ou de droit privé s'engage envers une collectivité publique, une établissement public ou un organisme à participation majoritaire des intérêts publics à réaliser un ouvrage ou à leur fournir des biens ou des services moyennant un prix.

La procédure de passation d'un marché public est obligatoire pour toute opération dont le coût total est supérieur à 50 millions de FCFA.

Les marchés publics doivent être conclus avant le commencement de la prestation de service.

Le prix du marché doit être ferme et définitif aussi souvent que possible. La revision des prix doit faire l'objet, quand elle est nécessaire d'une concertation au niveau d'un comité technique comprenant le Directeur des prix, le Directeur du budget, la Direction Générale des Grands Travaux et le responsable de l'entreprise qui exécute les travaux.

Le montant du cautionnement est fixé entre 2 et 5 % du montant total du marché. La retenue de garantie doit être au plus égal à 10 % du marché.

Les marchés sont passés normalement sur appel d'offres et, exceptionnellement de gré à gré.

L'attribution du marché se fait après l'étude en commission du rapport d'analyse de chaque offre.

La Direction Générale des Grands Travaux (DGTC) rattaché aux Services du Premier Ministre est chargé de veiller à l'exécution de cette réglementation.

.../...

Hormis le cas des marchés publics, l'acquéreur de technologie comme dans beaucoup de Pays en voie de Développement est souvent en position de faiblesse ceci pour des raisons suivantes:

- manque d'informations fiables sur les technologies disponibles;
- faible niveau de culture technologique chez les négociants
- mauvaise connaissance des pratiques commerciales internationales
- difficulté à déterminer objectivement le coût d'une technologie.

Les donneurs de technologies profitent de cette situation pour faire passer leurs conditions et cela aboutit souvent à la signature de contrats mal négociés.

L'absence de règlementation en matière de transfert de technologies et des sutructures de contrôle et d'enregistrement des contrats expose les promoteurs d'entreprises aux risques suivants:

- les machines proposées ne sont pas adaptées à la production
- technologie vendue est surfactuée
- les procédés ou les techniques de fabrication proposées ne sont pas entièrement communiqués à l'acquéreur et il reste dépendant du fournisseur.

Pour aider les promoteurs camerounais, un certain nombre d'actions ont été menées dans le cadre du projet TIES :

1°) Une enquête sur les technologies existantes a eu lieu et les résultats obtenus vont être exploités pour donner lieu à un échange de données technologiques.Cette enquête a été menée par un consultant en collaboration avec le point focal du projet qui a orienté les travaux.

Pour la formation, un séminaire regroupant les officiels des administrations et les entrepreneurs a eu lieu à DOUALA du 13 au 16 Avril 1993.

Ce séminaire a permis aux promoteurs de se préparer pour examiner de façon plus approfondie les projets avec les partenaires potentiels lors du Forum Industriel du 22 au 26 Novembre 1993 à YAOUNDE.

.../...

Les recommandations de ce séminaire vont de la création d'un système national d'acquisition, d'adaptation de suivi et de promotion de transfert de technologie en renforçant les activités de Promotion Industrielle au sein du Ministère du Développement Industriel et Commercial, à l'amélioration des capacités de négociation par d'autres séminaires ateliers basés sur le sujet

En un mot, l'ONUDI est interpellé ici pour qu'elle améliore le climat de transfert de technologie au Cameroun par :

- l'aide à l'élaboration d'une législation et l'établissement d'un mécanisme d'enregistrement,
- l'aide à la formulation d'une politique nationale technologique et industrielle, et permettre l'accès à ses banques de données dans le domaine de l'information industrielle et technologique.
- amélioration des capacités de négociation des contrats technologiques pour les entreprises privées et publiques par les séminaires et ateliers sur les modalités contractuelles;
- intégrer de plus en plus le point focal dans toutes les activités du TIES au niveau national et international par des voyages d'études, l'assistance aux réunions du TIES MONDIAL relatives au transfert de technologie dans tous ses aspects pour améliorer ses prestations dans la réalisation des objectifs du projet dans le pays.

ANNEX D

COUNTRY REPORT - EGYPT

Policy and Institutional Framework on Technology Transfer and Development

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Technology Policy and Regulation in Egypt

Although Technology was used in Egypt for thousands of years, there was not any clear, approved and known technology policy to assist the decision makers at all levels.

During the last five decades (1940s - 1970s), technology was supplied to Egypt, through technology transfer agreement from foreign suppliers and through technical and technological researches at the Egyptian R&D units and institutes.

For more than five years, the Academy of Scientific Research and Technology with the collaboration of GOFI and most productive, service, educational economical organizations had prepared a proposed technology policy for Egypt, a document includes the main particles and proposed issues were discussed and presented to the cabinet.

The document includes four main chapters:

a) The needs for a National Technology Policy.

b) Supports and axis of the National Technology Policy.

c) National Objectives of the National Technology Policy.

d) Methods, systems and procedures to achieve the National Technology Policy.

During the same period a group of national experts and representatives of the scientific and productive sectors prepared a national code to evaluate and register all the transfer of technology agreements. This Code has not been issued yet although its main features and procedures is applied at GOFI especially for TOT int he field of Industry.

Due to the new international trend which aims to encourage privatization, and the agreement signed between Egypt and the World Bank, the entrepreneurs are not obliged to evaluate and register their TOT agreement at GOFI.

GOFI as a governmental organization is responsible for planning and encouraging industry projects, gives a lot of free services, advices, consultancy works including evaluation and preparation of Technology Agreement to help the Egyptian firms to sign TOT agreements on reasonable technical, financial, economical and legal conditions.

Assistance given by GOFI to entrepreneurs

a) Inform with main Technology Sources,

b) Help in choosing the appropriate technology,

c) Assist during the contracting phase,

d) Evaluate the draft contracts before signing,

e) Follow up the technology supply phase,

f) Work as a link between R&D national units and entrepreneurs,

g) Prepare and organize workshops and seminars to develop and upgrade the factories personnel,

h) Help in solving any problems that will happen between the suppliers and entrepreneurs.

i) Register the TOT agreements,

j) Share in preparing the national studies dealing with technology.

ANNEX E

COUNTRY REPORT - ETHIOPIA

Policy and Institutional Framework on Technology Transfer and Development

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PROSPECTS, POLICIES, AND INSTITUTIONAL DEVELOPMENTS ON TECHNOLOGY TRANSFER AND DEVELOPMENT

Introduction

Ethiopia's economy is based mainly on agriculture. The technology level and the contribution of industry to the economy are low. The biggest industrial branches are food and textiles,while basic metal and engineering industries are very few.

Industries are mainly owned by the state due to a nationalization process of the former regime. The private industry has existed hardly on small scale and handicraft level.These industries were established through simple purchase based on the investor's information.

For establishment of new state enterprises, projects were planned and implemented through different mechanisms. Mostly,the technology selection was performed by consultants. Projects were accepted sometimes through high level officials deal in a package form. Properly identified projects were also ending up to turn-key nature due to insufficient emphasis given to technology transfer by decision makers,lack of policy, legal, and institutional infrastructure.

Generally technology transfer and development was characterized by

- inadequate identification of potential industries
- poor information system to identify technology sources
- acquisition of technology in a package form without proper evaluation
- low level of utilization of technology institutions to improve indigenous capability
- weak technology diffusion

Policy Measures

Ethiopia is now exercising a new economic policy geared towards free-market economy. Agricultural-development-led-industrialization strategy is set. This is to be attained through promotion of labour intensive technology and utilization of domestically available raw-materials.

The promotional measures for mobilizing and developing private sector investments have created a favourable climate for the development of domestic private capital together with the inflow of foreign investments and technology.

State enterprises have received autonomy of management. Corporations are dissolved. Intensive scrutiny is undergoing to transfer these enterprises to private ownership stage by stage.

A national science and technology policy is adopted with the aim of building science and technology capabilities as an instrument for economic development. The policy contains the aims and purposes of science and technology. Guidelines and strategies towards increasing science and technology capabilities, sectors and programmes to which priority is given, organization and structural set up of institutions, source of support and cooperation.

Recently, a technology transfer policy is also pronounced. This would allow evaluation and monitoring of foreign technologies based on the strategy of the country.

Institutional support

Various institution which are directly or indirectly related to technology transfer and development exist in Ethiopia. To mention few

1. Technology Policy and Research Department of the Ministry of Industry:

   It is the contact point of TIES programme. It coordinates industrial science and technology projects, prepares guidelines and policies of technology transfer and development, enhance the capability of technological personnel through trainings, seminars etc. by collaborating with concerned organizations, provide information to industries.

2. Ethiopian Science and Technology Commission:

   Its role is to guide the development of science and technology and to render policy advice on such matters. It has seven departments for different sectors and five research centers. One of the center is the patent and technology transfer center.

3. Sectoral Research Centers:

   Food Research and Development Center, Engineering Design and Tool center, Handicraft and Small Scale Industries Promotion are some of the centers under the Ministry of Industry which deal on research and technology development.

4. Investment Office of Ethiopia:

   It is a newly organized office supervised by a board of investment and is serving as a focal institution for investments in Ethiopia.

5. Industrial Project Service:

   It is a state-owned consulting organization offering feasibility preparation services and assistance in project implementation through tender preparation, equipment verification and other project management services.

6. Associations and Professional Societies

   These are newly flourishing groups concerned with acquisition of appropriate technology.

Activities and Prospects in Brief

The fourth African TIES meeting passed a resolution sensitizing members to strengthen capability by sharing experience on technologies, to coordinate efforts towards technology policy, to establish an information exchange system.

The Technology Transfer Manual, the Guide to agro and agro based sectors on technology transfer and the trainings provided by TIES are main components for our knowledge on technology transfer. Moreover, TIES NEWSLETTER and TIES WATCH are the valuable tools for updating our information.

In accordance with the TIES programme, the Technology Policy and Research department has achieved its prior goal of acquisition of policies and institutions. Ethiopia is striding forward towards acquiring many industries and different technologies as compared to previous times. Therefore, we must further

- develop an efficient system on technology transfer and development.
- transform the dormant institutions into active ones.
- properly utilize the policies adopted.
- conduct local workshops.
- use the rich source of information of TIES and member countries.
- arm ourselves with the required knowledge on the subject.

ANNEX F

COUNTRY REPORT - GHANA

Policy and Institutional Framework on Technology Transfer and Development

Mrs. Ruth Nyakotey
Secretary to the Board and
Head, Legal Department
Ghana Investments Centre
Accra

The purpose of this paper is to examine the status and recent developments in the policy, institutional and administrative framework in the field of technology transfer and development in Ghana. An attempt will also be made to examine their implications for the technology transfer and development process.

'Technology transfer' is seen within the commercial context where technology is acquired at a cost from foreign suppliers in the expectation that its acquisition will enable the recipient country access to gains such as skills creation and enhancement, positive effect on the balance of payments access to markets, stimulation of R & D activities and industrial transformation of the economy generally.

THE POLICY FRAMEWORK

Development policies and strategies pursued by post-independence governments in Ghana favoured accelerated approach to development where the state led as the entrepreneur and developer. This policy led to the establishment of state owned enterprises in all sectors of the economy to spear head the economic transformation process. Reasons assigned for this policy include the unsophisticated and rudimentary nature of local enterprises the absence of a capital market and the lack of requisite technological skills and knowledge, locally. In keeping with this development philosophy, policies and strategies pursued were discriminately and hostile to FDI and thereby hindered the development and growth of the Ghanaian private sector. During that period, efforts were more centered on the minimisation of the direct financial costs of technology acquisition which was done through the regulation of foreign exchange transfers. Despite the heavy investment made in the establishment of institutions of research, science and technology acquisition and development was not made a critical issue in the development process.

The Economic Recovery Programme which was launched in 1981 has assigned a key role to the private sector to lead the development process. This policy has necessitated the liberalisation of the economy and still calls for further changes to ensure the institution of a stable, pragmatic and transparent policies and strategies as an incentive to ellicit the appropriate response from the private sector. Also stressed, is the need, among others, to exploit foreign technologies and management skills for the industrial transformation process; to develop technology support policies and institutions which are firm-focussed and directed at assisting in technology identification, absorption and adaptation; and investment in training facilities directed at enhancing labour skills in areas such as assembly, basic machining and fabrication, repairs and maintenance and quality control.

Trade and Industrial Policy:

The Trade and Industrial Policy statement issued by the Ministry of Trade in 1992 lists the following constraints, among others, to the development of the trade and industrial sectors:-

"(a) obsolete machinery and technology;
(b) uncompetitive pricing resulting from high production costs due in part to obsolete technology, machinery and equipment;
(c) over-dependence, in some cases, on imported inputs and their high costs resulting from the depreciation of the cedi;
(d) low investment in Research and Development;
(e) weak and inefficient planning, production and marketing systems;
(f) inadequate manpower capabilities."

With particular reference to Industry, policy objective is geared towards:-
"(a) development a more internationally competitive industrial sector with emphasis on

local resource based industries with capacity and potential for export and efficient import substitution;

(b) generation of employment with emphasis on job creation in small and medium scale enterprises thereby contributing to employment;

(c) promotion of ecological balance; and

(d) capacity building in the enterpreneurial, scientific, engineering, managerial, financial and marketing fields."

In the light of these policies, efforts are being made to streamline the Enabling Environment in order to render it stable and pre dictable as a means of generating the necessary confidence in the framework for investments.

As a result of the market-orientated policies, being pursued presently in Ghana, the whole issue of foreign investment and technology screening and regulation particularly, the structure of the Investment promotion agencies set up to handle foreign investment and technology, their mandates and functions as well as the contents and aims of the screening function are under serious discussion with a view to streamlining them and making them less regulatory, transparent and 'investor friendly'. In sum, the screening of foreign investment is under attack in view of its perceived ineffectiveness, delays and its alleged harmful effects on the general enabling environment. With the waves of trade and investment liberalisation policies conquering the developing world, the reformists are questioning the whole basis of the screening function and urging Investment promotion and handling agencies to organise to provide investor services in the form of information, advice and assistance to foreign investors instead of screening, regulatory and monitoring functions. Hence the call for promotion oriented institutions and laws. This restructuring and re-orientation will also affect other departments and agencies of government that handle investors and investments such as the Central Bank, Customs & Excise Department, Immigration and the Internal Revenue Office. The quest for more investments in terms of volume in Ghana is gradually setting the stage for a system of automaticity of investment and technology approvals based upon transparent and well-defined criteria instead of the hitherto case by case approach.

With respect to technology promotion, it is expected that the following technology promotion policies will be employed as a means of creating a facilitatory role for the industrial transformation process:-

"(a) an assessment of currently available human and technological resources.

(b) encouragement of private investment in skills upgradation through appropriately designed apprenticeship systems and skill certification systems.

(c) Refocusing the efforts of the Council for Scientific and Industrial Research (CSIR) system away from developing basic technologies toward:

(i) disseminating technology, product and foreign competitor information;

(ii) assisting specific industrial subsectors in developing inter-industry and intra-industry linkages, in standardizing production methods, and in developing modernization plants, and

(iii) assisting individual firms in solving specific production problems, in selecting plant and machinery, in designing appropriate work procedures associated with new capital investments, and in identifying and adapting new technologies".

THE LEGISLATIVE FRAMEWORK:

In Ghana, foreign investment and technology transactions operate within a multiplicity of legislations. The main instruments are discussed below:-

The Exchange Control Act, 1961

The Exchange Control Act has since the early days of industrialization, constituted the major mechanism for the regulation of foreign investment in Ghana. Unfortunately however, technology acquisition considerations are not addressed in the law. The law puts more emphasis on financial costs in view of its foreign exchange conservation thrust.

This law is presently under review with a view to harmonising its objectives with the market policies being presently pursued in Ghana under the ongoing structural Adjustment Programme.

The Investment Code, 1985

The Investment Code, 1985 (PNDC Law 116) as amended and which is also under review still remains the major policy instrument on Government industrial policy.

The Investment Code affirms in its preamble government recognition of the fact that foreign investment has a role to play in accelerating the pace of economic and social development. Through the medium of the Code, Government seeks to attract foreign investment and technology while at the same time ensuring that foreign capital participates on terms and conditions which are in consonance with socio-economic development objectives of the country.

The role envisaged for foreign investment and technology which may be discerned from the criteria for investment may be broadly summarised as contribution to the economy in terms of development of natural resources; employment creation; contribution to the rural development effort to achieve balanced development; transfer of technology and managerial skills to citizens; and provision of linkages between the different sectors of the economy.

In recognition of the fact that issues pertaining to technology transfer are inextricably linked with issues of foreign investment. The Code, therefore, includes special provisions which provide the framework for more detailed administrative procedures and guidelines for the regulation of technology imports. Under the Code, the Ghana Investments Centre, as the agency which has responsibility for the screening of foreign investment is mandated to screen, approve, register and monitor all new and existing technology transfer agreements.

The Code defines "Technology transfer Contract" as:-

"any agreement relating to an enterprise approved under this Code involving:-

i. the assignment, sale and use of foreign patents, trade marks or other industrial property rights;

ii. the supply of foreign technology know-how or technological knowledge;

iii. foreign technical assistance, design and engineering consultancy or other technical services in whatever form they may be supplied;

iv. foreign managerial, marketing or other services.

Agreements of a period of duration of less than eighteen months are, however, excluded from this definition. The objective is to exclude short duration agreements for technical assistance

and consultancy services from the ambit of regulation.

The selection, evaluation and actual negotiation still remains the responsibility of the parties. Government intervenes through the Ghana Investments Centre to co-ordinate, advise and monitor the transfer process.

The technology regulatory system envisaged under the Code operates within the framework of detailed Regulations promulgated by the Centre covering the following:-

(a) criteria for the approval of technology transfer agreements;
(b) remuneration for technology transfer and reasonableness of fees;
(c) reasonableness of duration of agreement;

(d) restrictive business practices;
(e) transfer and absorption of technology;
(f) form and procedure for approval and monitoring of technology transfer agreements;
(g) any other matter relating to technology transfer agreements that appears to the centre to be reasonably necessary.

Between 1985 and 1992, a specialised Inter-Ministerial Committee of experts known as the Technology Transfer Committee was set up to assist the Centre in handling all applications for approval. The Committee prepared Draft Internal guidelines which sought to ensure that:-

(a) technological goals were identified and clearly articulated in the agreements;
(b) the technological services being acquired were clearly identified or specified in the agreement;
(c) the specific commitments of the suppliers and recipients were properly negotiated and stated;
(d) the recipient enterprises were not made reliant on the suppliers services, policies and techniques;
(e) in terms of institution, organisation and management, the local enterprise was ensured unimpeded access to the core technology and further development.
(f) access to markets by the local enterprise is not unduly restricted;
(g) the mechanism for enforcing the contracts and for settling disputes was in the best interests of the local enterprise.

The ultimate aim was to, as far as possible, eliminate abuses and internal constraints that inhibit real transfer and to ensure that the terms and conditions under which technology is purchased are in consonance with national socio-economic development objectives.

Since the promulgation of the Code from 1985 to date, 74 Technology Transfer Agreements have been submitted for consideration and approval by the Centre out of which 35 have been granted approval. About 60 % of the Agreements submitted are agreements existing and concluded prior to the coming into force of the Code. The majority of the Agreements are Technical Assistance and Service Agreements or a combination of technical Assistance and Management Contracts. The rest are pure management agreements followed by licensing contracts in that order.

The trends observed in the agreements considered so far support the following preliminary findings:-

(a) about 40 per cent of the agreements have been in existence for over 20 years

without review;

(b) where periods of duration are specified, they are for inordinately long periods;

(c) the agreements do not define in any meaningful detail the technology or related services /which is the subject of the transfer;

(d) there are no meaningful and detailed training provisions geared towards enabling local personnel to absorb, and adapt the technology;

(e) most of the agreements are between Transnational Corporations (TNCs) and their affiliates and subsidiaries in Ghana who are seeking approval to legitimise the continuation of technology payments for technical and management services.

(f) a multiplicity of agreements exist between wholly-owned foreign companies and their local subsidiaries which do not cover any ascertainable technology or services but only serve as a framework for spurious arrangements to enable fees to be transferred;

(g) the management arrangements and dispute settlement mechanisms established in the agreements are not supportive of the transfer and development process.

(h) the agreements contain various restrictive clauses which seek to inhibit the transfer and development process and access to markets.

(i) there is no attempt at localising the technology through R & D.

THE TECHNOLOGY TRANSFER REGULATIONS:

In December 1992, the Government promulgated the Technology Transfer Regulations 1992 (Legislative Instrument 1547).

The highlights of the Regulation are as follows:-

(i) It confirms the mandatory registration of all new and existing technology transfer contracts and categorises in advance a set of standard clauses which are not acceptable in technology transfer contracts while indicating certain set of standard clauses which should be reflected in such agreements to gain approval.

(ii) **Obligations of Technology Supplier**

The Regulations make it obligatory on the transferor of technology:-

(a) to provide requisite training for the transferee and its personnel in the effective utilization of the licensed technology and also to attach a detailed training schedule to guide and be adhered to by the transferor in the provision of training.

(b) to be responsible for all taxes due on royalties;

(c) to give full description of the technology and to supply all necessary documentation and information in the English language;

(d) to guarantee the efficient performance of the technology and the continuous availability of essential spare parts;

(e) to inform the transferee of improvements and innovations relating to the technology and to supply same on terms mutually acceptable to both parties;

(iii) **Obligations of the Transferee**

The transferee's obligations which are related only to confidentiality are to:-

(a) keep the transferred technology confidential and to use it only for its own production during and after the expiration of the agreement;

(b) not to sub-licence without the consent of the transferor and on mutually acceptable terms to both parties, the licensed know-how.

(iv) **Applicable Law**
All Technology transfer agreements are to be governed by the laws of Ghana.

(v) **Duration of Agreement:**
The Regulations stipulate that the duration of a technology transfer Agreement shall not exceed 10 years but may be renewed if considered desirable by the parties for further periods not exceeding 5 years for each subsequent term.

(vi) **Dispute Settlement:**
The Regulations encourage amicable settlement as the initial mode of dispute settlement failing which, the dispute may be referred for resolution in accordance with the rules of arbitration of the United Nations Commission on International Trade Law or within the framework of any bilateral or multilateral dispute settlement mechanism established under any Investment Protection Regimes to which the Governments of the transferor and transferee are parties or in accordance with any other International machinery for the settlement of investment disputes agreed to by the parties.

(vii) **PAYMENT FOR TECHNOLOGY**

The Regulations stipulate different levels of remuneration for different types of technology transfer relationships as follows:-

(a) Royalty in respect of know-how patents and other industrial property rights shall range from 0 % to 6 % of net sales of the technology recipient.

(b) (i) Fee for Technical Service/Assistance (including know-how) shall range between 0 % to 5 % of net sales.
(ii) Fee for know-how shall not exceed 2 % of net sales.
(iii) The parties shall have the option of allowing "running" or "lump sum" fee considering the nature of the technical service, its duration and dependence of the transferee on continued foreign technical expertise. Where continuing service is deemed to be required "running" fees will be favoured.

(c) (i) Management fees shall range between 0 % and 2 % of profit before tax.
(ii) Management services of projects for which profit is not anticipated during the early years shall attract a fee ranging from 0 % and 2 % of net sales during the first 3 to 5 years.
(iii) The level of payments provided under sub-paragraphs (1) and (2) of this paragraph shall be reduced pro rata if the transferor has 60 % or more of the equity share capital of the transferee company.

(d) Where a transferor provides management/technical services, in addition to patents know-how and trademarks, the total fee shall not exceed 8 % of net sales.

The Regulations provide for the payment of fees higher in appropriate cases beyond the levels specified provided, but subject to approval by the Centre.

Finally, the law provides for incentive royalties for sales of licensed products in overseas territories if marketed under the trademarks of the transferor including subsidiaries of overseas firms.

Under the 1985 Investment Code, the Centre was given a further mandate to advise investors

with respect to the choice and suitability of technology. It was envisaged that the Centre would carry out this mandate as part of its investment project appraisal and approval functions under the Code. The performance of this function effectively presupposes that the Centre has information on alternative technologies as well as the results of the application of different technologies under varying conditions in different countries, which is non-existent. The Centre was, therefore, not able to perform this aspect of its mandate effectively. Project proposals are evaluated by the Centre only in terms of their compliance with the Code's requirements regarding ownership and capital and in terms of the investment priority areas define by the Code for purposes of enjoying appropriate incentives under the Code. The appraisal is mainly in terms of financial, economic and technical viability: technology is not an issue.

The Centre's mandate to advise on technology choice has, since the end of 1992, been withdrawn in line with the market oriented policies being pursued by Government. The thrust of policy is to leave technology choice and negotiation to the entrepreneur. The authority hitherto given to government agencies like the Ghana Investments Centre to assess technology imports has accordingly been revoked by law. In future efforts will centre on the provision of information an advisory services only to potential users of foreign technology, which is expected to be done through the establishment of Databanks on technologies and technology agreements in liaison with appropriate International Agencies.

THE PUBLIC AGREEMENTS BOARD LAW

The law which was envisaged under PNDC Law 42 seeks to review all public agreements with foreign suppliers in the public sector. "Public agreement" is defined to include any agreement to which the government or a public corporation is a party.

The law also mandates the Public Agreements Board to establish substantive criteria to govern all government agencies or organs, public corporations and other public bodies in the negotiation and conclusion of public agreements. The thrust of the law is conservation of "the national or public interest having regard particularly to the problems of external debts and budgetary deficit"

This narrows the scope and focus of the PAB's functions as well as the procedures and substantive criteria which the PAB has to draw up to guide other Public bodies in the negotiation and conclusion of public agreements to financial considerations aimed at foreign exchange conservation and not technological and developmental implications of such contracts. It is, therefore, not surprising that the PAB's analysis of public agreements is limited to the legal considerations, external debt, foreign exchange and budgetary implications of the Contracts.

THE PETROLEUM EXPLORATION AND PRODUCTION LAW, 1984 (PNDC LAW 84)
THE MINERALS AND MINING LAW - 1986 (PNDC LAW 153)
THE NATIONAL ENERGY BOARD LAW 1983

Investments in the Petroleum, mining and Energy sectors are respectively governed by the Petroleum Exploration and Production Law of 1983, the Minerals Code and the National Energy Board Law, 1983. Under PNDC Law 42 which gave birth to these laws and, indeed, under all these legislations, the relevant institutions namely, the Ghana National Petroleum Corporation, the Minerals Commission and the National Energy Board are all empowered to, among others, receive assess and monitor all agreements in their respective areas of operations and to formulate criteria and methodology for the screening of related technology transfer contracts.

Multidisciplinary sub-committee of the Minerals Commission which comprises experts

drawn from the different Government Ministries and agencies have responsibility for the screening of mining project proposals and agreements in the energy sector.

A model Lease Agreement prepared by the Minerals Commission forms the basis for the screening of mining agreements which are mostly mining leases. In spite of the technological implications of mining activities, the Model Agreement centers efforts mainly on economic and financial issues. The Model Agreement covers issues like duration, training, taxation as well as the financial and technical standing of prospective investors.

Screening of agreements in the Energy Sector is undertaken by the Ministry of Fuel and Power on behalf of the National Energy Board (NEB). The Ministry performs this role through a Negotiating Committee or Task Force made up of legal, tax and economic experts.

The guidelines for the screening of such proposals is in the form of a Model Agreement which highlights financial issues like taxation royalty payments, training and legal issues like applicable law and force majeure clauses.

THE INDUSTRIAL PROPERTY REGIME

Patents

The Patents Registration Ordinance (Cap. 179) of 1925 together with the Patents registration (Amendment) Decree of 1972 are the legal instruments that govern patents in Ghana. The latter (the Amendment Decree) prohibits the registration of patents in the pharmaceutical field. The implication of this colonial legislation is to link the patent regime in Ghana to that of the united Kingdom. Several years after independence this dependent systems still persists. Ghana, therefore, does not have a system or original patent registration since patents can only be registered in Ghana upon proof of prior registration in the United Kingdom. The Patent law is presently being reviewed with a view to replacing it with the regime which will be more consistent with the economic and technological aspiration of the country. This review is necessary since Patents and Trade Marks are a common feature of the technology acquisition process in Ghana.

Trade Marks

The first legislation on Trade Marks was passed in 1925. This was the Trade Marks Ordinance (Cap. 180) which was subsequently amended by the Trade Marks (Amendment) Ordinance (Cap. 181). In 1965, the existing laws were reviewed and consolidated under the Trade Marks Act, 1965 (Act. 270). The Act introduced the concept of Certification and also made provision for the registration of such marks by a Minister of State. Wide powers are given to the Minister of State under the law including the power to "take in any place outside Ghana such lawful steps whether by way of action or prosecution at law or otherwise as he may think proper to prevent, restrain or to secure publishing for the registration, use of application in relation to or in respect of goods not grown, produced or manufactured in Ghana of a trade mark or other mark of description indicating or suggesting or likely to lead to the belief that the goods in respect of which or in which that trade mark, mark or description is used or applied was grown, produced or manufactured in Ghana.

Trade Marks may be registered for an initial period of seven years after which they may be renewed for a further period of fourteen years.

The Industrial property laws are administered by the Registrar-General's Department under the Ministry of Justice.

Environmental Impact Certificate - Draft Guidelines

In pursuance of a government directive in March 1979 mandating all Investment Promotion agencies and developers to liaise with the Environmental Protection Council (EPC) for purposes of obtaining an Environmental Impact Certificate, the Environmental Protection Council (EPC) has published Draft Guidelines and procedures for obtaining Environmental Impact Certificate in cases where an Environmental Impact Statement (EIS) is required for a proposed project or development.

On the basis of project proposal and application forms submitted by the developer or prospective investor with a statement indicating the impact on the environment by its intended actions, the Internal Review Committee (IRC) consults relevant bodies and authorities in reviewing the Statement after which it will then issue appropriate guidelines to be followed by the enterprise and submit its recommendation to the EPC for final approval.

THE INSTITUTIONAL FRAMEWORK

A multiplicity of institutions are involved in the technology transfer and development process in Ghana. These Institutions and bodies may be classified into two broad categories:-

(a) Government supported institutions which are in charge of advising the government on issues relating to the transfer and development process as a means of infusing the results of Research into policy making at the national level with the objective of co-ordinating efforts to adapt imported technology and up grade existing ones such as the Council for Scientific Research (CSIR) and its units and projects particularly the Policy and Strategic Institute ; and

(b) Government institutions that are used directly to intervene in the transfer process which includes the three investment promotion agencies (Ghana Investments Centre, the Energy Board and the Petroleum Corporation) with mandate to screen technology transfer transactions in their respective areas of jurisdiction and the Public agreements Board which assesses Investment arrangements between foreign suppliers and enterprises in which the government has proprietary interest.

THE MINISTRY OF SCIENCE AND TECHNOLOGY

The present Civilian Administration which came into office at the beginning of 1993 has highlighted role and expected contribution of science and technology in the development process with the establishment of a Ministry responsible solely for Science and Technology. This is a welcome departure from the situation that existed under previous Administrations where the Science and Technology portfolio had been merged with Trade and Industry portfolios. Under the previous arrangement, the Science and technology function was argely ignored since no effort was made to establish the requisite institutional structure with the capability of, among other things, policy formulation, planning and programming, monitoring and evaluation, co-ordination and implementation. The Ministry of Science and Technology has supervisory role over the Council for Scientific and Industrial Research (CSIR) and its institutes.

THE COUNCIL FOR SCIENTIFIC AND INDUSTRIAL RESEARCH (CSIR)

The (CSIR) was established in 1958 as a semi-autonomous scientific and technical arm of the Government with the following functions:-

(a) to advise Government and its agencies on scientific and technological advances of

national importance with particular reference to the efficient utilisation of conservation of Ghana's natural resources;

(b) to encourage scientific and industrial research in areas of national priority such as agriculture, industry technology and medicine;

(c) to establish research units and facilities and to supervise and coordinate such research within its units and other research institutions countrywide;

(d) to co-operate and liaise with organisations outside Ghana on matters of research;

(e) to set up appropriate training schemes for the training of scientific personnel.

The CSIR has under its jurisdiction some 13 research institutes units and projects working in areas such as animal, Building and Road, crops, food, Aquatic biology, Industry, Oil Palm, soil, water Herbs and Atlas and notably the Technology Transfer Centre (T.T.C) which has now been restructured under a new name - Policy Research and Strategic Planning Institute (PORSPI).

THE POLICY RESEARCH AND STRATEGIC PLANNING INSTITUTE (PORSPI)

PORSPI (formerly Technology Transfer Centre) was originally established in 1981 under the Ministry of Industries Science and Technology. In 1982, it became a multidisciplinary Unit of the CSIR with mandate to engage in Policy Research, education, and documentation on issues related to technology policy. The T.T.C. which was the predecessor institution has made major strides through the initiation of sectoral and other studies to sensitise policy makers and implementors and to assist in the establishment of policies which will enhance technology transfer and development.

PORSPI has since 1992 been restructured to serve a wider function which includes, among others, provision of direct technical support to the Ministry of Science and Technology through policy research, analysis, data collection and processing. PORSPI is therefore expected to propel and maintain the dynamics of continuous appraisal and changes in policies and generation and adoption of appropriate policies including changes in the institutional framework.

GRATIS

GRATIS was established by the previous Ministry of Industries Science and Technology to train artisans in foundery operations and machining skills in selected District and Regional Centres with the ultimate objective of promoting industrial transformation at the level of small scale enterprise sector.

DAPIT

This project was set up as a means of enhancing the transfer of intermediate technologies to rural sector industries and to contribute to increased production and raise incomes of rural small scale enterpreneurs.

THE GHANA STANDARDS BOARD (GSB)

GSB was established in 1967 to oversee the establishment and promulgation of standards, testing and analysis, products certification and quality control, among others, and to provide advice in related matters to Government and Industry. The Board performs its functions through technical sub-committees.

THE GHANA INVESTMENTS CENTRE

Under the 1985 Investment Code, the Ghana Investments Centre is given the mandate to encourage, promote and co-ordinate investments in the Ghanaian economy. More specifically, the Centre has power to approve the establishment of investments in all sectors of the economy other than investments in the Petroleum and Mineral sectors.

No technology transfer can be effective without the prior approval of the Centre. Under the Code, the Centre is also enjoined to maintain a record of all technology transfer agreements.

THE MINERALS COMMISSION

The Commission has responsibility over investments in the mining sector under the Minerals Code. It also has responsibility under the law for assessing related technologies for exploration and exploitation activities in the sector.

THE ENERGY BOARD

The National Energy Board is enjoined to receive and assess public agreements in the energy sector including related technology transfer transactions. Although the Model Agreement used as a basis for negotiation seeks to investigate training of local personnel, the thrust is financial and legal or the direct costs of such transactions.

THE GHANA NATIONAL PETROLEUM CORPORATION

The Corporation has the mandate to receive and assess investment proposals in the sector including related technology transfer transactions.

Similar to the Minerals Commission, the Ghana National petroleum Corporation has not evolved any explicit guidelines for screening technology transactions in the sector. The screening is essentially legal and financial.

THE PUBLIC AGREEMENTS BOARD (PAB)

This Board has mandate to review all public agreements or as defined by the law, any agreement to which the government or a public corporation is a party.

The Board deals with agreements submitted on case by case basis and, therefore, has no detailed criteria governing its mode of operations. The law empowers the Committee to co-opt experts from outside its membership which is established by the law. This power, if judiciously, employed can be turned to advantage particularly in ensuring that technology transfer issues are addressed in addition to financial and legal issues.

The membership of the Board consists of a Chairman appointed by government and nominees of the Attorney-General, the Ministry of Finance and Economic Planning and of the Bank of Ghana.

Although the Board has powers under the law "to co-opt not more than three additional members with particular expertise to assist it in considering public agreements relating to matters in respect of which such co-opted members have the necessary expert knowledge", the statutory membership of unspecified nominees of the Legal and Financial agencies of the Government

machinery shows the usual biased view of the public agreement which often tends to emphasise its commercial nature to the detriment of its technological implications.

THE REGISTRAR GENERAL'S DEPARTMENT (RGD)

This Department which is under the ministry of Justice has responsibility for registration of Business entities under the Companies Code, the Incorporated Private Partnerships Act and other legislations governing business associations. RGD also has special responsibility for administering the Industrial property laws.

THE BANK OF GHANA

The Bank of Ghana plays a dominant role in the regulatory process through the administration of the Exchange Control Act of 1961 which operates alongside the other laws. The Bank has mandate to approve and monitor all transactions that involve the disbursement of foreign exchange. The enabling legislation is presently being reviewed to bring it in line with the present market-oriented policies being pursued by Government.

THE SECTOR MINISTRIES

The Sector ministries still play a dominant role in the technology acquisition and development process. They have evolved their own systems, procedures and practices for acquiring technology for SOE under their jurisdictions with or without the assistance of the PAB. In most cases, the supervising Ministries initiate investment and technology transactions on behalf of the government agencies under their supervision and, as such, they have the potential to influence the technology transfer process.

THE STATE ENTERPRISE COMMISSION

The State Enterprises Commission (SEC) is a government institution which oversees state-owned industrial Enterprises. According to its instrument of incorporation, the state Enterprises Commission Act of 1981 (Act. 433), the Commission is to, among others:-

(a) review the objective, programmes and activities of the prescribed body and where necessary, recommend to government their revision;
(b) wherever necessary undertake a technical audit to determine the efficiency of the technical operations of the prescribed body;
(c) undertake the periodic management audit of the prescribed body;
(d) establish an objective personnel appraisal system for the prescribed body and monitor its compliance;
(e) undertake detailed studies to determine the socio-economic viability of the prescribed body and made recommendations to Government.

Thus, the State Enterprises Commission in view of its supervisory and monitoring role over enterprises in the State Industrial sector has enormous potential to influence their contribution to the transfer and development process.

THE ENVIRONMENTAL PROTECTION COUNCIL

All agencies dealing with investment approvals are required to submit copies of project documents to the Environmental Protection Council (EPC) for Environmental Impact Assessment

(EIA). The EPC is charged with responsibility for issuing a Certificate of Clearance indicating that no damaging environmental impact would result from the implementation of the project of that adequate provisions have been made in the project proposals to contain any potentially adverse environmental impact arising from the project. The EPC is also mandated to monitor environmental impact of existing enterprises.

CONCLUSIONS:

(a) the on-going liberalisation of the enabling environment to make it supportive of the present policy of private sector-led development poses serious challenges to the technology transfer and development process. The supportive changes that are needed in the legal and regulatory frameworks should not, however, be at the expense of effective organisation for capability accumulation for technological capacity building.

(b) While it is agreed that there is a need to bring about transparency and lack of arbitrariness in the investment approval processes in order to correct the negative perceptions of prospective investors, it is also necessary in so doing to ensure that enterpreneurs operate within appropriate legal and regulatory frameworks which will ensure effective technology transfer. This is necessary if we are to ensure that critical technological decisions which are involved in investments are influenced through the medium of appropriate policies so that the private sector led development envisaged will have the desired impact on the industrial transformation process.

In sum, the expected dynamic investment response should go along with an equally dynamic technological response from both the private sector and the government.

This calls for recognition at the highest policy making levels of the fact that technology is central to the socio-economic development process.

Technology transferors view the transfer relationship as pure sale contract, and are, therefore, not interested in effecting transfer. In view of the present policies which are leading to restructured ownership patterns, favouring 100 % foreign ownership; joint-ventures with very high levels of foreign participation giving foreigners control and also with the free-entry and automatic system of approvals, the onus for ensuring meaningful technology transfer and development must of necessity shift considerably from the operators to Government.

SUGGESTIONS:

There is a need, among others:-

(a) for a science and technology policy to guide policy makers and implementors and to pave the way for technology development.

(b) to sensitise Government at the highest levels of the potential and contribution of science and technology to the development process.

(c) for the establishment of a meaningful relationship between Science and Technology research institutes and industry and to relate their activities to declared national priorities.

(d) for the restructuring and streamlining of the legal and institutional framework with a view to removing jurisdictional overlaps, inefficiencies and strengthening them to infuse the results of science and technology research into planning and monitoring functions.

(e) to initiate and sustain meaningful training programmes for scientific, technical and

management personnel in all sectors of the economy.

(f) to institute policies which will engender among the populace a science and technology awareness and culture.

(g) for rationalisation of the tax system and the investment incentive regimes to make them more supportive of the transfer and development process.

(h) Finally, but more importantly, there is the need for organisation for purposes of acquiring information since the successful implementation of (a) to (g) above cannot be done without information.

NOTES:

1. For a detailed discussion of the Legal and Administrative Framework in Ghana, see The technology Regulatory Framework in Ghana" by Ruth Nyakotey in Joint-Ventures as a Channel for the Transfer of Technology.

   UNCTAD/ITP/TEC/9

2. Assessment of Guidelines and Review Procedures used by Technology Transfer Registries in Ghana.

   UNDP/TTC DOC 10

3. Technology Policy with Special emphasis on technology Agreements.

   UNDP/TTC DOC 2

4. The CSIR and the Public

   UNDP/TTC DOC 23

5. Facilitating Foreign Investment
   Government Institutions to Screen, Monitor
   Service Investment from Abroad
   - Foreign Investment Advisory Service
     Occasional paper 2
     by Lou T. Wells, JR. & Alvin G. Wirt.

   This paper discusses the challenges facing investment promotion agencies and the screening function.

6. Technology Policy Failures in Nigeria
   - Akin O. Adubifa

   IDRC Manuscript
   Report 18 be
   April 1988

   This paper discusses the reasons behind the failure of technology policies in Nigeria as a commentary on the performance of African public institutions, policy makers and implementors. It is relevant to the Ghanaian case.

7. Ghana - 2000 and Beyond: Setting the stage for Accelerated and Equitable Growth
   World bank (West Africa Department
   June 16, 1992.

   This paper embodies the vision for the future.

ANNEX G

COUNTRY REPORT - KENYA

Policy and Institutional Framework on Technology Transfer and Development

Mr. Jasper Mani
Chief Science Secretary
National Council for Science & Technology

POLICY AND INSTITUTIONAL DEVELOPMENT OF TECHNOLOGY ACQUISITION AND TRANSFER: CURRENT POSITION AND PROSPECTS IN KENYA

1. INTRODUCTION

Kenya intends to adopt industrialization increasingly as the prime mover of social and economic development. This is reflected in several policy documents including, Sessional Paper No. 10 of 1965, various Five Year Development Plans, especially the current 6th Five Year Development Plan; and Sessional Paper No. 1 of 1986 on Economic Management for Renewed Growth.

Industrialization for sustainable development depends on the effective application of scientific knowledge and skills for the commercial production of goods and services. Industrial technology is highly commercialized, protected and exploited by the few who develop it. This is done through practices that are unfamiliar to most developing countries like Kenya. In such countries, sustainable industrialization can be achieved only when a critical mass of indigenous capacity to absorb, develop and utilize technology is attained.

2. POLICY

Kenya does not have an explicit policy for the acquisition and transfer of technology. The status-quo is that there are no clear terms of reference , roles and functions of existing institutions involved in one way or the other with technology transfer and development. Some of these institutions include ministries responsible for Research, Technical Training and Technology, Commerce and Industry, Education, Public Works and Land Reclamation.

Lack of a clear cut policy on technology acquisition and transfer became a major concern for the National Council for Science and Technology in 1989. The question posed is why, for example, Kenya had not achieved much scientific and technological capability in the thirty (30) years of political independence. Other issues related to whether or not there was an overemphasis on Research and Development at the expense of institutional infrastructure for transfer, acquisition, commercialization and utilization of technology. After observing that the infrastructure for integration of scientific and technological research results in the overall socio-economic development plan is weak, the Council set itself to explore ways of developing a mechanism to facilitate this integration. The first step was to form a consortium of experts to look at the whole question of industrial technology policy and a regulatory environment for development. A report has been compiled with the objective of examining existing policies, strategies and institutional arrangements. This should lead to defining ways in which the infrastructure could be utilized more effectively in technology transfer. Furthermore, the diagnosis is expected to lead to a more effective mechanism for the transfer of foreign technology and involvement of Kenyan entrepreneurs in joint ventures on fair terms. Although this report is still a matter for more critical analysis and finalization in wider fora, the recommendations are aimed at stimulating Kenyan capabilities, including Research and Development institutions, financial institutions and regulatory machinery to develop new technologies and adapt available ones for development needs.

3. INCENTIVES FOR INVESTMENT, ACQUISITION AND TRANSFER OF TECHNOLOGY

The Government blue-print outlines the priority areas in its investment policies which are in themselves pointers to the type of technologies required for development or acquisition. These areas are outlined as follows:-

a) *Job Creation:* Priority is given to investments which create jobs. Labour intensive industries such as textiles, component assembly and data processing are highly encouraged.

b) *Utilization of Domestic Raw Materials:* Investments which use domestic raw materials are encouraged. High priority is accorded to local resource based activities such as agro-processing, mining and leather production.

c) *Foreign Exchange:* Foreign exchange earning industries such as export oriented activities.

d) *Training and Technology Transfer:* Priority is given to activities which involve introduction of new skills and technologies.

e) *Rural Development:* Investments which have a high potential for contributing to food security are encouraged. These include irrigation, new crops or technologies which improve farm output.

In order to encourage transfer and acquisition of technology, Kenya offers a wide range of investment incentives. To facilitate such investment, the Kenya Government has set up both institutional and enabling

infrastructure. It is pertinent to indicate two key Kenyan institutions charged with support and advice on conditions and facilities for private investment. These are the Investment Promotion Centre (IPC) and the Capital Issues Committee (CIC).

Briefly, the functions of IPC are:-

a) Contact point for both locals and foreigners who wish to invest in Kenya; it supplies information required for investment.

b) Providing guidelines on technology transfer and acquisition for use in Kenya. However, it has not developed a policy framework on the issue of technology transfer and acquisition.

CIS, on the other hand, approves all term agreements involving payments of foreign exchange. It also reviews applications of technology payment above KShs.500,000.00 including fees for technical services, licence fees and royalties.

After having highlighted the above issues, it is now important to enumerate the enabling environment created by the Kenya Government. This environment consists of the following incentives:-

a) ***Investment Allowance:*** Investors located in Nairobi and Mombasa enjoy 35% investment allowance on plant, machinery and buildings. Those in rural areas enjoy 85%, while manufacturers under bond enjoy 100% investment allowance.

b) ***Capital Allowances/Depreciation:*** In addition to investment allowances, depreciation before Tax

Liability is allowed as follows:-

- Building 2.5%
- Plant and Machinery 12.5%

- Computer and Office Equipment 30%
- Vehicles Trucks and Tractors 25 - 37.5%

Additional depreciation may be permitted for continuous process plants.

c) Exemption from Customs Duties and Value Added Tax.

To give support to small scale industries located in rural areas, imported plant and machinery up to a maximum of CIF of KShs.40 million is exempted from customs duties and VAT.

d) ***Export Compensation:*** Export Compensation is offered equivalent to 20 per cent of FOB Value of exports on manufactured goods whose local value added exceeds 30%.

e) ***Duty Exemption Scheme:*** Goods imported for use in manufacture of products for export will be granted duty remission.

f) ***Manufacturing Under Bond:*** The manufacturing under bond which duty free concessions are allowed on plant machinery, components and raw materials to manufacturers producing exclusively for exports. These producers also enjoy priority allocation of import licenses and other approvals. The facilities are found in Kenya's major towns such as Nairobi and Mombasa.

g) ***Export Processing Zone's (EPZ's):*** EPZ's have been established. The private zone located in Nairobi is operational. The two public zones located in Mombasa and Athi River are expected to be operational soon. The incentives in the EPZs include:-

- Duty and Tax free access to imported inputs
- 1st ten year tax holiday and only 25% in the next ten years.
- No withholding tax during the first ten years for non-residents.

Additionally:-

- Kenya is a member of the Multilateral Investment Guarantee Agency (MIGA) and the International Centre for the Settlement of Disputes (ICSID).
- Individuals investing in Kenya have access to the Overseas Private Insurance Corporation (OPIC) in regard to non-commercial risks.

- Short and Medium term funds are available from a well developed financial system. Apart from the Central Bank, 28 Commercial Banks, over 40 non-banking financial institutions, 6 development financial institutions, 47 insurance companies and over 900 savings and credit society operate in Kenya.

4. THE ROLE OF MULTINATIONAL CORPORATION

Finally, the role of Multinational Corporation's (MNCs) in transfer of technology in Kenya cannot be overlooked. When MNCs began operations in Kenya, there was indiscriminate transfer of technologies into Kenya. This approach proved expensive in economic terms. There was therefore need to readjust the terms and conditions of

operations by MNCs to facilitate increased participation of indigenous firms and citizens. Although the overall result expected was to enhance the process of technology acquisition, it is however difficult to assess the impact of MNCs. This is due to the many and varied technological agreements underlying the technology transfer processes. So far these agreements fall under two major categories viz.

- Operation with equity involvement
- Operation with non-equity involvement

After a careful study of MNCs, it was recommended that meaningful technological transformation by MNCs should include the following:-

- Increased MNC equity shares to workers
- Involving end users of technology in identifying, developing and adapting new technologies.
- Introducing cost-effective technologies at grassroot levels.
- Strong linkage among MNCs, local enterprises and small scale enterprises for production of spares.

5. FUTURE DIRECTION AND CONCLUSION

It has already been stated that Kenya does not have a clear cut policy on the technology transfer and acquisition. It is also important to point out that socio-economic development in Kenya and other developing countries has to be science and technology driven. Economic aid through loans has already proved a burden through debt accumulation and servicing. This situation calls for a deliberate change towards adoption of a development approach which will have minimal dependence. In this context, Kenya, through the National Council for Science and Technology, is in the process of rallying both human and financial resources for developing an "Industrial Technology Policy". No doubt the African - TIES will become a major resource.

It is also expected that UNIDO will play a key role in facilitating the formulation of the policy.

ANNEX H
COUNTRY REPORT - MAURITIUS
Policy and Institutional Framework on Technology Transfer and Development

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FIFTH AFRICAIN-TIES MEETING
RABAT - MOROCCO

COUNTRY PAPER
MAURITIUS

INDUSTRIAL EXPERIENCE

Mauritius is a small island state with limited natural resources. It is highly dependent on external trade. Twenty years earlier the country had little industrial experience, except in sugar processing. Soon the country was to start experiencing serious Balance of Payments difficulties and a rising rate of unemployment. In a move to create employment and improve its BOP the government adopted an industrial diversification policy aimed at import substitution. Considerable fiscal protection was to be provided in order to sustain these industries.

Thriving in an highly protected market, these industries could not achieve economies of scale nor felt the need to upgrade technology. This was to be further aggravated by the smallness of the domestic market. Hence the type of industrial development encouraged did not give the required results either in the form of substantial employment creation, improvement of BOP or development of technology.

Studies carried out indicated the need for a change in strategy toward export-oriented industrialisation. Since the early 1930's therefor , the government is following an export led strategy that has created quasi full employment in less than a decade and led to BOP surpluses. The new strategy combined inter perferential market access to the EEC helped the economy to experience rapid growth during the past decade. It grew at an average rate of 6 % per annum, more than doubled its per capita income to $ 2,410 in 1991. The manufacturing sector accounted for 39 % of formal employment and is also the largest sector of the economy in terms of value-added and exports. The growth was however based on the rapid expansion of labour intensive garment manufacturing for export mainly in low value added, lowskill garments.

The country is now in a situation where due to rising labour costs unmatched by productivity and value added shortage of labour and, on the international hont, the emergence of many how cost labour surplus industrialising competitors and of a new class of more exacting customers, it is losing its initial comparative advantage. In addition, preferential market access

conditions can no longer be taken for granted. In the area of capital accumulation and productivity although there is still some scope through automation and mechanisation, prospects are limited Besides, these conditions have made foreign investment into the country less attractive. The new challenges now facing Mauritius indicate the need to upgrade existing operations, adopt labour-saving technologies and diversify exports into high value added activities.

Mauritius is conscious that in order to meet these challenges now facing it will require the building up of competence in new skilles and more and more complex technologies as well as keep pace with international trend in technology.

TECHNOLOGICAL CAPABILITY AND INSTITUTIONAL SUPPORT

Technology capability refers to the ability to assess, select, use, assimilate, adapt, improve and develop technologies that are appropriate to changing circum stances. Such capability is embodied in human resources and institutions.

Until recently in Muraritius the development of such capability was left almost entirely to the private sector where by the interplay of market forces and the need to adopt labours saving techniques, have urged firms to move to mechanisation and automation. Foreign direct investment, which presently control 45 % of the export processing zone, played significant role in the transfer aquisition and development of technology. This consisted not only of capital of production technology but more importantly of linkage and network capability such as sourcing and marketing expertise, management and technical skills, product design, international standards and quality control. However such transfer is limited to a few firms many of the foreign firms being of the foot-loose category. Automation and use of higher technology among locally used firms have also been carried by a few big companies. Besides R & D activities generally carried out by such firms relate to minor adjustments to equipments and in innovations in production engineering.

Thus unlike the sugar sector where Mauritius has achieved world class knowhow and R & D capability. The first phase of our industrial diversification has involved simple skills and technologies. Designs and technical advice are generally provided by overseas parent companies or by foreign customers and principals. A number of the longer local garment manufacturers were able to increase productivity in activities amenable to mechanisation, by purchasing capital intensive equipment for which basic operating know-how, training and maintenance are available

from equipment venders. Until recently, technology issues in the manufacturing sector thus played a relatively minor role.

Government had so far played the role of a facilitator creating the night environment and providing the necessary infrastructure. Thus the Mauritius Standards Bureau is providing testing, calibration and quality control. The Mauritius Export Development and Investment Authority on its part carries out exports and investment promotion. The Small and Medium Industries Development Organisation provides advisory services to such firms and is also building up a worlds and dies manufacturing visit. The Export Processing Zone Development Autority has been set up to advise firms (presently it is concentrating on the textile industries) on the use of labour-saving operations. The Industrial and Vocational Training Board is providing training for the existing industries.

At the present economic juncture of the country when the manufacturing sector is finding it difficult to maintain its growth momentum and competitiveness is threatened by cul-throat competition on the global market, there is a felt need for government invention to nurture technology acquisition and diffusion so as to enable the country to maintain its international competitiveness and move to higher technology sectors and there by higher-value added products. This "de facto" implies the building up of the human capital. In this context it is important to note that the comparatively low percentage of science students and engineering graduates may act as a serious constraint.

TECHNOLOGY POLICY

Because Mauritius is a small, open economy highly dependent on external trade, international competitiveness is the overriding factor in the determination of economic growth and welfare. The last two decades have been marked by rapid technological change. Recent advances in process and information technology are reshaping competition on global markets, offering unprecedented opportunities for economies that can successfully adopt and master technology. Experience reveales that there are strong linkages between technology, the trade regime and international competitiveness. Typical examples are the Asian NIE's where industrial development was the result of the inter play between technological capability and incentives which influence the use of such capability, stimulate its growth and renewal.

But given the new challenges facing the country there is a need to gear technology capability into the desired direction. In this context the achievement of stability and high rates of capital accumulation are necessary conditions. At the sectoral level government is adopting a

selective intervention policy and providing support systems which will facilitate the drive towards higher technology. Government will thus continue to play the enabling role of a central facilitator in providing the necessary back-up and institutional support but the focus will hence forth be on a selective approach in order to gear technological development. Technology policy will thus aimat upgrading the level of technology, acquire know-how in high tech sectors, develop appropriate skills and attract more foreign investment. A study is currently under way to examine all aspects relating to the transfer and acquisition of technology.with the current technological strategy the institutions in place are being encouraged to play a more effective role. Thus the exports and investments promotion agency will gear its efforts to selected sectors and the training institution to new sectors. In addition the EPZ Development Authority has recently signed an agneement for collaboration with an Industrial Research Institution in South Africa.

Other new institutions and mechanisms have also been set up to faster technology acquisition and development. These include (1). The Mauritius Research Council to poster, co-ordinate and guide research in all areas of interest to the country. It will thurs also advise government on matters related to research and encourage its commercial utilisation (2). The Industrial Council to advise on the appropriate incentive framework for the accelerated modernisation and expansion of the industrial sector, promotion of foreign direct investment and transfer of technology, capital intensive industrialisation, development of environmentally friendly industries, technological modernisation and advancement and human resources development.(3) A venture capital fund to encourage innovation and development of technology.

LEGAL ASPECT

A new Industrial Expansion has recently come into force which aims at consolidating and rationalising existing laws relating to industry and which at the same time provides for the encouragement of industries which will promote and enhance technological development and use new/high technology or create support industries. Foreign Direct investment is expected to play a vital role in this strategy.

With regard to Protection of Industrial Property, the Trade Marks Act provides for protection of Trade Marks and the Patents Act for the protection of inventions. However there is yet no specific legislation for the protection of industrial designs but this short coming is being addressed.

ANNEX I

COUNTRY REPORT - MOROCCO

Policy and Institutional Framework on Technology Transfer and Development

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INTRODUCTION

Il peut paraître superfétatoire de dire que la technologie ou plus exactement la capacité de création et de mise au point de technologies neuves est actuellement le nerf de la compétitivité économique internationale. Par contre il n'est pas inutile de répéter que son transfert vers les pays qui en sont dépourvus ne peut donner des résultats probants que s'il existe un environnement adéquat.

Cet environnement n'existait pas au Maroc, au lendemain de son indépendance. La situation économique se caractérisait par une baisse importante du niveau de l'investissement, un ralentissement de la croissance, une augmentation du chômage, une fuite massive des capitaux.

Afin de redresser l'économie, la priorité fut donnée à l'accroissement des investissements. Cette priorité restera présente depuis lors. Par contre, aucune politique clairement définie en matière technologique n'a été conçue et mise en oeuvre. L'attitude des pouvoirs publics suggère que l'ouverture aux investissements directs étrangers devrait permettre l'industrialisation du pays et le transfert de technologies (I).

Or, l'expérience a montré qu'on ne peut atteindre une maîtrise technologique, si on ne cherche pas à optimiser les avantages de ces investissements en termes de transfert réel d'aptitudes et de savoir faire. En d'autres termes, l'autonomie en matière de technologie suppose l'existence d'une capacité d'absorption technologique (II).

I - Le flux des investissements directs comme vecteur de transfert de technologie.

Il y a lieu, tout d'abord, de s'interroger sur les stratégies de développement industriel adoptée depuis l'accession à l'indépendance. Ces stratégies expliquent la nature des technologies utilisées (A). Nous examinerons ensuite les mesures prises pour encourager l'investissement (B) et les organismes créés pour promouvoir l'industrialisation (C), en essayant de faire ressortir dans quelle mesure leur incidence technologique est conforme aux options économiques retenues.

A - La stratégie de développement.

Après l'indépendance, l'Etat s'est fixé d'importants objectifs économiques et sociaux dans le cadre de plans de développement. L'analyse de ces documents ainsi que les mesures d'accompagnement montrent une évolution dans la stratégie de développement. Jusqu'au milieu des années 70, l'accent était mis sur la valorisation des ressources locales et l'import substitution. Depuis , on insiste de plus en plus sur la promotion des exportations.

1● La substitution aux importations.

On peut définir la politique de substitution aux importations comme la mise en place d'un appareil productif afin de réduire la part des importations dans l'offre globale.

En optant en faveur d'une industrialisation fondée sur la substitution aux importations, le premier plan quinquennal (1960 - 1964) avait donné la priorité à celle qui part de l'amont. En effet, l'industrie de base était considérée comme un facteur fondamental pour, d'une part valoriser les ressources locales, et d'autre part développer un tissu industriel de plus en plus dense.

Cette option va se concrétiser par la réalisation d'ensembles industriels dans le cadre d'entreprises conjointes.

Ce choix a des conséquences connues en matière de technologies employées. Celles-ci sont généralement sophistiquées. Elles demandent des capitaux élevés. Elles provoquent, tout au moins dans un premier temps, une augmentation des importations pour satisfaire les besoins en pièces détachées. Enfin elles sont faibles consommatrices de main-d'oeuvre.

Un changement sera opéré après 1965. Le plan triennal 1965 - 1967 ainsi et le plan quinquennal 1968 - 1972 avaient opté pour une substitution à l'importation en partant de l'aval, c'est à dire en partant des industries de biens de consommation qu'on appelle également des industries légères. Celles-ci ne devraient pas entraîner de coûts trop élevés dans la mesure où le capital requis est faible, la main d'œuvre peu qualifiée et la technologie plus simple Elles pourraient en outre travailler à pleine capacité pour une échelle de production réduite[1].

Durant cette période, le secteur privé marocain a commencé à sortir d'une position d'attente et d'hésitation où il s'était confiné. Ses domaines d'intervention étaient le textile, les articles en plastique, les matériaux de construction, alors que l'investissement public s'orientait vers la valorisation des ressources agricoles[2].

Cependant cette stratégie connaîtra, dès la fin des années 60, les limites qu'elle avait connues dans les autres pays où elle était appliquée, tels les pays d'Amérique Latine. Les effets d'entraînement, qui devraient permettre une remontée progressive de l'aval vers l'amont, n'ont pas eu lieu ou très faiblement. Ce qui explique que la part des importations dans l'offre totale des biens d'équipement et du matériel électrique et électronique reste élevee et atteint respectivement 81% et 47% en 1990.

G. GRELLET. Structures et stratégie du développement économique PUF 1986.

Les plans 65-67 et 68-72 n'accordaient pas la priorité à l'industrie mais plutôt à l'agriculture, le tourisme et la formation des cadres

La raison principale de cet essoufflement tient à la faiblesse de la demande locale, elle-même conséquence de trois facteurs.

Tout d'abord, et comme nous l'avons dit, les investissements publics s'orientaient vers la réalisation d'unités utilisant des technologies à coefficient de capital très élevé malgré le changement des priorités. C'est le cas des sucreries , des cimenteries...). Ce qui offre moins d'occasions aux sans emplois de trouver du travail.

Le deuxième facteur tient à la faiblesse du pouvoir d'achat en raison des taux de salaire bas et des prix élevés pratiqués par les industries protégées de la concurrence internationale par les mécanismes douaniers.

L'étroitesse du marché local découle également de l'inégale répartition des revenus.

Face à ces blocages, les plans élaborés à partir de 1973 insistent davantage sur l'industrie en tant qu'impératif national[3] et sur la promotion de l'exportation des biens manufacturés pour atténuer le déséquilibre du commerce extérieur.

2● la promotion des exportations

Sans délaisser les industries substitutives aux importations, l'Etat fait de la croissance des industries exportatrices une nécessité inéluctable et une condition du décollage économique.

Cette nouvelle orientation requiert une intervention accrue de l'Etat dans la mise en place des infrastructures de base, dans la réalisation des projets industriels conjointement avec le capital privé national et étranger, dans la création d'organismes de promotion des exp
ortations (CMPE, SMAEX...)[4] dans l'édiction de mesures d'incitation.

L'Etat adoptait ainsi davantage une politique industrielle volontariste que libérale.

Sur le plan des réalisations, son intervention en tant qu'entrepreneur s'est concrétisée par la poursuite du programme sucrier, l'extension de la capacité de transformation des phosphates et le lancement du plan cimentier. Conjointement avec le secteur public ou seul, le capital privé investissait essentiellement dans certaines branches de l'agro-alimentaire, dans le textile, la confection, le cuir...

Cette politique s'est traduite par une forte progression des dépenses budgétaires, et par un appel important aux emprunts extérieurs. Conjugée aux médiocres performances

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"L'industrialisation du pays est devenue un impératif national... l'Etat interviendra de manière plus décisive en tant que promoteur et entrepreneur" Plan 1973 - 1977, vol I, p. 56.

Centre Marocain de Promotion des Exportations, Société Marocaine d'Assurance à l'exportation.

des exportations et à la conjoncture internationale défavorable, elle a contribué à creuser de façon sensible les déficits budgétaires, commerciaux et financiers.

Cette situation a amené les pouvoirs publics à élaborer un plan triennal de stabilisation en 1978. Sur les suggestions du FMI et de la Banque mondiale, le gouvernement s'est engagé, à partir de 1983, dans une politique économique de rigueur appelée Programme d'ajustement structurel et caractérisée par la dépréciation du dirham, la rigueur budgétaire, la vérité des prix, la libéralisation du commerce extérieur[5] et la privatisation des entreprises publiques[6].

Les résultats au niveau du commerce extérieur sont retracés dans les tableaux ci-après[7] :

Le taux maximum des droits de douane a été ramené progressivement de 400 % en 1983 à 40 % en 1992.

La privatisation concerne 112 entreprises publiques sur un total de 665 (non compris les Etablissements publics administratifs). Loi n● 39-89 promulguée par le Dahir 1-90-01. BO du 18/4/90.

A. Lakhdar et B. Norredine : La réglementation des changes à l'heure de la convertibilité du dirham. Rabat, 1993.

Structure des exportations 1983 - 1992 en %

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Produits alimentaires	25,3	22,4	25,3	29,5	27,1	25,3	25,7	24,8	27,9	26,4
Energie	4,0	4,0	3,9	2,6	2,8	2,1	2,6	3,6	2,5	3,1
Produits bruts d'origine :										
-animale et végétale ;	2,5	2,4	2,6	3,1	3,5	3,8	4,7	4,2	3,1	3,3
-minérale	27,2	28,9	26,2	20,0	16,2	17,3	18,5	13,4	11,0	10,8
Produits manufacturés :										
- demi-produits	25,7	26,8	24,3	22,5	23,9	29,0	21,0	25,2	25,4	24,1
- biens d'équipement	0,5	0,7	0,7	1,9	1,3	1,2	3,5	3,6	4,1	4,4
- biens de consommation	14,8	14,8	17,0	20,4	25,2	21,3	24,0	25,2	26,0	27,9

On relève le recul de la part des produits bruts d'origine minérale et l'augmentation remarquable de la part des produits de consommation (vêtements, bonneterie, maroquinerie, médicaments, pièces détachées pour voitures...).

Structures des importations 1983 - 1992 en %

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Produits alimentaires	14,8	16,9	13,2	12,5	11,3	10,7	10,7	8,4	8,6	12,1
Energie	27,5	26,1	27,9	15,7	17,5	13,2	15,4	16,9	14,4	15,3
Produits bruts d'origine :										
	7,1	7,8	8,5	8,1	7,8	7,7	7,4	6,3	6,5	6,7
- animale et végétale ;	5,4	5,4	7,2	8,1	7,7	8,6	4,0	5,8	5,3	4,4
- minérale	19,3	18,9	19,2	21,8	23,2	26,4	26,0	24,1	25,5	23,5
-demi-produits	19,0	18,8	16,9	23,8	20,9	22,4	25,7	26,9	27,2	26,7
biens d'équipement	6,9	6,1	7,1	10,0	11,6	11,0	10,8	11,6	12,5	11,3
biens de consommation										

On remarque que les biens d'équipements occupent la première place dans les importations. Avec les demi-produits, ils représentent 50% du total.

L'industrie marocaine présente ainsi deux caractéristiques importantes :

Tout d'abord elle demeure dépendante de ses importations de biens d'équipement et de demi-produits qui jouent un rôle essentiel dans le processus d'industrialisation. Ceci illustre encore une fois que : la fameuse "remontée de filière" vers les industries da base n'a pas eu lieu.

Ensuite, elle présente une faible diversification de ses exportations et ce, mal gré l'effort déployé dans ce sens.

Sur le plan de leurs implications technologiques, les deux stratégies adoptées entraînent souvent les mêmes effets. Elles subissent le plus fort degré de contrainte technologique.

Dans le cas de la stratégie de substitution aux importations, en partant de l'amont, les possibilités de choix des technologies peuvent être très limités, comme ils peuvent être "imposés" lorsque ce sont les filiales d'entreprises multinationales qui réalisent l'investissement dans le pays. Dans ce cas, la filiale adopte les équipements et les procèdés de fabrication mis en oeuvre par la société mère. Généralement ces technologies consomment peu de main d'oeuvre.

La seule exception concerne certaines industries de biens de consommation telles que le textile.

Dans le cas de la stratégie d'industrialisation par la promotion des exportations, la contrainte technologique est évidente.

Puisque l'objectif est d'exporter des produits vers le marché mondial et en particulier celui des pays développés, ce sont les normes en vigueur dans ces pays qui commandent les choix des procédés de fabrication. Pour être compétitif, il apparaît nécessaire d'acquérir les technologies les plus performantes.

Enfin les deux stratégies nécessitent un flux d'investissements important. Afin d'encourager ce mouvement, des mesures d'incitation ont été adoptées.

B - LES MESURES D'INCITATION À L'INVESTISSEMENT :

Afin d'attirer les capitaux nationaux et étranger, l'Etat a adopté plusieurs mécanismes juridiques dont les plus remarquables sont constitués par les codes d'investissements. Depuis 1958, quatre codes se sont succédés. Le dernier en date (1983) sera prochainement remplacé[8]. Trois traits fondamentaux caractérisent cette évolution.

En premier lieu, les réformes élargissent le champ d'application des codes.

En second lieu, elles visent à accroître les avantages pouvant être accordés.

Enfin, elles allègent et assouplissent la procédure administrative à suivre pour l'obtention de l'agrément.

Il n'est bien sûr pas dans notre intention d'étudier en détail les différentes dispositions de ces textes. Nous nous limiterons à l'analyse des mesures qui peuvent avoir des incidences sur le choix des technologies à employer.

Suite à la lettre Royale adressée au Premier Ministre, une réforme du système d'incitation est en cours de préparation. (v. Le matin du Sahara du 15/06/1993).

1● L'extension du champ d'application des mesures d'incitation.

La principale caractéristique des codes de 1958 et 1960 est la sélectivité des activités éligibles : En effet ils privilégiaient l'investissement dans l'industrie de base (la sidérurgie, la grande industrie chimique minérale, le raffinage des hydrocarbures, les chantiers navals). Ce choix était d'ailleurs conforme aux priorités dégagées par le premier plan quinquennal.

Par contre, les codes de 1973 et 1983, en élargissant leur champ d'application, tendent à encourager tous les investissements privés et toutes les industries qu'elles soient lourdes, de fabrication des biens intermédiaires ou de produits de consommation de masse. Ces investissements peuvent être réalisés pour satisfaire les besoins du marché intérieur comme ils peuvent être orientés vers le marché mondial. En plus, le code de 1983 s'applique non seulement aux entreprises industrielles mais également aux industries à caractère industriel, c'est à dire celles ayant une connexion avec l'industrie proprement dite[9], et aux entreprises de service liées à l'industrie[10].

L'introduction de cette dernière catégorie d'entreprises constitue une innovation pouvant avoir une répercussion technologique de taille dans la mesure où elle encourage la création d'unités d'ingénierie. La promotion d'une ingénierie locale répond à deux préoccupations, financière et relative à la maîtrise de la technologie. Elle est susceptible d'avoir pour effet de réduire la sortie des devises occasionnée par l'appel aux cabinets étrangers.Elle permettra aussi et surtout de franchir une première étape vers l'autonomie technologique.

Dans une étude sur l'ingineering au Maroc, M Germouni[11] constate qu'en 1976 celui-ci absorbait près de 12% du montant global des investissements industriels et qu'il est assuré à plus de 90 % par l'engineering étranger et les filiales marocaines des sociétés étrangères installées au Maroc. Ces chiffres révèlent le fort degré de dépendance de l'économie marocaine par rapport à l'étranger sur le plan de la satisfaction de ses besoins en études et en travaux de conception. Ils montrent aussi combien est positive l'extension des avantages du code aux entreprises d'études. Mais comme le code de 1983 fait bénéficier de ses avantages toutes les sociétés, quelle que soit la nationalité de leur actionnaires, contrairement au code de 1973, on peut craindre qu'il ne profite qu'aux filiales des sociétés étrangères. Auquel cas l'autonomie recherchée risque d'être une illusion s'il n'y a pas une volonté de renforcer et de privilégier l'engineering marocain. Or la lecture du Plan d'Orientation de 1988 - 1992 montre que le recours aux firmes étrangères, pour les diverses études préalables à l'implantation des

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Ex : Atelier destinés à la maintenance d'équipements industriels, réparations navales, entrepôts frigorifiques...

Ces dernières concernent les bureaux d'études techniques, les entreprises effectuant des travaux informatiques, des laboratoires d'essais et d'analyse de matières premières, des produits finis ou semi-finis utilisés ou produits par l'industrie. Articles, 1 et 2 du Décret du 17 / 01 / 1983 pris pour l'application de la loi relative aux investissements industriels.

M; GERMOUNI : Essai sur les problèmes de l'engineering et de la technologie au Maroc. Ed. de la Faculté de Droit de Rabat 1978.

ensembles industriels, reste prédominant[12] et ce, malgré la création de plusieurs entreprises et cabinets spécialisés dans ce domaine[13].

2● Un traitement spécifique pour certains investissements technologiques.

Certaines dispositions du code prévoient un traitement préférentiel pour les petites et moyennes entreprises, les entreprises exportatrices, les technologies économisant les ressources rares et celles qui protègent l'environnement. D'autres sont dissuasives et d'autres enfin imposent le recours au cadre contractuel.

D'après le code de 1983, les PME sont celles dont le programme d'investissement ne dépasse pas 5 millions de dirhams et dont le montant par emploi stable[14] n'excède pas 70 000 DH. Elles seules peuvent bénéficier d'une prime à la création d'emploi de 5000 DH, en plus bien sûr des autres avantages prévus dans le code. En dehors de la création de postes de travail, l'objectif recherché est la constitution d'un tissu industriel dense et intégré pouvant offrir un réseau de sous traitance locale et internationale.

Un traitement privilégié est également réservé aux matériels, outillages et biens d'équipement spécifiquement destinés à la réalisation d'économies d'eau, d'énergie, à l'utilisation des ressources d energies autre que d'origine pétrolière, ou à la préservation de l'environnement. Le code prévoit pour ces investissements l'exonération du droit d'importation. Ainsi l'Etat préfère la persuasion à la contrainte pour amener les investisseurs à choisir les technologies qui tiennent compte de la rareté des ressources locales.

Par ailleurs, le code fait une place à part aux entreprises industrielles exportatrices qui, en plus des avantages prévus par les textes de 1973 (modifiés en 1988), bénéficient du remboursement de la taxe spéciale et, le cas échéant, du droit d'importation préalablement acquitté sur les matériels, outillages et biens d'équipements (M.O.B.E) importés.

Une autre mesure ayant une incidence sur les technologies utilisées a trait à l'exclusion de l'exonération de la taxe d'importation pour les matériels, outillages et biens d'équipement lorsque ces derniers sont fabriqués localement ou lorsque leur utilisation n'est pas conforme aux objectifs du développement[15]. Si l'Etat montre ainsi l'orientation vers les technologies

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Plan d'Orientation 1988 - 1992 p. 119.

Ex : Laboratoire public d'études et d'essais (LPEE) Institut sucrier d'études, de recherche et de Formation (ISERF), AGA ingénierie, IMEG, CERPHOS, SMESI, IMEC etc.

L'emploi stable est défini comme une création d'un poste de travail ayant donné lieu au recrutement effectif d'un salarié pour une période de 12 mois consécutifs au moins.

Une liste annuelle des MOBE exclus des exonérations est publiée par le Ministère du Commerce et de l'Industrie. Il s'agit pour l'essentiel des MOBE produits localement. Ce code tend ainsi à protéger cette industrie qui reste fragile.

qu'il entend privilégier, il n'interdit pas pour autant l'importation du matériel en question. Cette disposition ne s'applique qu'aux entreprises importatrices qui veulent bénéficier des avantages fiscaux. Celles qui désirent s'en passer sont libres d'importer et d'utiliser les MOBE qu'elles préfèrent tout au moins depuis 1986, date de disparition de la liste C du Programme Général d'Importations[16].

Enfin, le code prévoit un traitement spécifique pour les entreprises dont les programmes d'investissement comportent des équipements d'une valeur supérieure à 50 millions de dirhams. Ces entreprises peuvent opter pour un régime dérogatoire dans le cadre de conventions à conclure avec l'Etat. Lequel cadre devient obligatoire pour les entreprises désirant exercer ou étendre leur activité dans des secteurs déterminés par décret. Il s'agit des industries de base telles que les raffineries, les fonderies, les cimenteries, des industries soumises pour leur réalisation à autorisations administratives préalables (montage de véhicules) ou de celles qui ne répondent pas à un intérêt économique public.

En plus de ces mesures, l'Etat a créé des institutions dans le but de promouvoir les investissements industriels.

C - Les institutions de promotion des investissements.

Plusieurs organismes ont été créés après l'indépendance pour promouvoir un développement accéléré de l'économie. Leurs appellations sont très variées et variables (Offices, Caisses, Bureaux, Centres, Régies...). Leur forme juridique n'est pas uniforme : on trouve aussi bien des établissements publics qui empruntent le cadre du droit public[17] que des sociétés à capital entièrement public ou d'économie mixte[18] régies principalement par le droit privé. Cette diversité caractérise également leur domaine d'activité qui peut être financier, agricole, industriel, de conseil.... C'est dire que l'étude, même si elle ne concerne que les organismes de promotion industrielle, risque d'être longue et fastidieuse. Nous nous limiterons donc à l'exemple du BEPI, devenu ODI, en raison de l'intérêt qu'il présente en matière de politique de transfert de technologie.

Le BEPI a été créé en 1957 avec pour attributions de "promouvoir toute étude de nature à contribuer au développement industriel du pays" et de "concourrir à son industrialisation". Il était habilité à prendre des participations dans tout groupement ou société ayant pour objet l'étude, l'installation ou l'exploitation d'une activité industrielle.

La liste C concerne les produits prohibés à l'importation.

Ex : OCP, CDG, ODI, CNCA...

Ex : BNDE, BMCE, SNI, Sucreries...

En ce qui concerne les études de projets d'investissements, le BEPI les réalisait à ses frais. Elles peuvent être de nature économique, financière ou technique. Pour accomplir cette mission, il s'était adjoint la collaboration de firmes d'engineering, de consultants étrangers et de la SETIM[19]. Cette société, dont il assurait la direction, avait pour tâches d'une part, de procéder à un inventaire du potentiel industriel qui devait aboutir à des propositions de reconversion et de concentration des entreprises et d'autre part de répartir les travaux de sous traitance locale occasionnés par la mise en chantier des unités industrielles. Cette dernière tâche était d'autant plus importante que, lors du lancement d'un appel d'offres, le BEPI incluait des clauses obligeant les soumissionnaires à prendre en considération la participation maximale des entreprises marocaines. Toutefois, en raison du caractère vague des obligations du fournisseur ou de l'emploi de techniques de pointe, l'industrie locale ne semble pas avoir pleinement profité de ces opportunités.

Sur le plan des participations, l'action du BEPI était à l'origine de la création de grands ensembles dans le raffinage des hydrocarbures (SAMIR), le textile (COFITEX), les pneumatiques (Général Tire), le montage de voitures (SOMACA, Berliet). Ces réalisations ont été effectuées dans le cadre de contrats "clé en mains" à un prix global et forfaitaire.

Le changement des orientations économiques opéré dès 1963 a eu pour effet la mise en veilleuse du BEPI, puis son remplacement par un Bureau d'Etudes Industrielles chargé uniquement de la préparation des études technico-économiques au profit des investisseurs.

Mais devant la carence manifestée par ces derniers, le législateur reviendra à une formule voisine du BEPI en créant l'ODI.

L'intervention de ce dernier en faveur du transfert de technologie est sous jacente : "concrètement, il s'agit d'enregistrer les demandes des investisseurs potentiels et de les mettre en relation avec ceux qui cherchent un partenaire ou bien une licence pour leur projet, ou avec ceux qui désirent vendre une technique. En s'efforçant de mettre en rapport investisseurs et vendeurs de technologie, l'ODI joue un rôle de coordonateur" [20].

Le transfert de technologie pouvant se réaliser par le biais de la sous traitance, l'action de l'ODI consiste à informer les entreprises intéressées et à mettre en relation les donneurs d'ordre étrangers et les industriels marocains.

Société d'Etudes et de Coordination Industrielle Marocaine dont l'initiative de création (1959) revenait au BEPI.

M. Belkhayat, ex directeur de l'ODI cité par M. Sebti A : L'entreprise conjointe et le développement. Le cas du Maroc, Thèse, droit, Nice, 1987, p. 529.

L'assistance technique, notamment aux PMI est une autre attribution de l'ODI. En faveur du promoteur, cette assistance comporte l'aide à la conception[21] et à la réalisation du projet. Au bénéfice des entreprises, l'assistance concerne la gestion, l'organisation de la production, la recherche de marché. Au profit d'un ensemble de PMI, cette assistance consiste dans la formation et la mise en relation avec d'éventuels partenaires pour une coopération technologique.

L'accès aux connaissances technologiques est recherché par l'ODI à travers la constitution d'entreprises conjointes avec des partenaires étrangers.

Pour illustrer le rôle et l'approche adoptée par l'ODI dans le domaine qui nous intéresse, nous citerons l'exemple de deux sociétés relevant de la branche des industries métallurgiques, mécaniques et électriques.

La première, la Compagnie Arabe de Machines Outils a été créée en 1982 dans le cadre de la coopération Maroco-Tunisienne. Participent au capital en plus de l'ODI, la Banque de Développement Economique de Tunisie, la Société des Industries Mécaniques et Electriques de Fès (SIMEF), les sociétés Hernaut SOMUA et Toyoda (HES) et la Société Arabe d'Investissements Industriels (SAII). HES participe au capital en contrepartie d'apport technologique d'équipements. Ses prestations techniques consistent en la concession d'une licence de brevet, la formation du personnel dans ses usines, l'assistance lors de la construction et du démarrage de l'usine et lors du contrôle de la qualité. Ayant commencé par la fabrication de tours et des fraiseuses, cette société s'est orientée vers une diversification de sa production. C'est ainsi qu'elle fabrique des perceuses avec un taux d'intégration de plus de 70%. Elle fait de la sous traitance de pièces telles que les carters de moteurs diesels et s'est lancé dans l'usinage des grosses pièces de précision, et dans le marché de la commande numérique.

Le deuxième exemple qui mérite d'être mentionné est celui de la SIMEF. Elle a été créée en 1973 en vue de la reconversion de la Manufacture Nationale d'Armes et de Munitions (MNAM). Les objectifs qui lui ont été assignés au départ étaient de rentabiliser le potentiel humain et le parc machines de la MNAM, et de pourvoir le pays d'une technologie en matière d'industrie mécanique et électrique[22].

Le choix des produits à fabriquer étant déjà fait, à savoir des moteurs électriques, à essence et diesel, il s'agissait dans une première phase de conclure des contrats de licences. Des accords furent signés avec Leroy Somer pour le moteur électrique, Motobécane et Peugeot pour celui à essence et Petter pour le Diesel. Ces accords prévoyaient soit la fourniture des plans uniquement (Diesel), soit, en plus, les spécifications des machines et un technicien pour le démarrage.

C'est à dire, l'identification, la définition de la capacité, le choix du site, l'information sur les procédures de création, et le choix de l'équipement nécessaire.

M. Zouaoui : La Simef, revue juridique, politique et économique. n● 12, 1982, p. 173.

Dans une deuxième phase, la SIMEF a commencé à élaborer des méthodes de fabrication, à définir des machines et à dessiner des outillages et ce, à partir des plans fournis par le bailleur de licence.

Elle a commencé à acquérir une autonomie dès le début des années 1980, lorsqu'elle entama la conception et la réalisation de produits dérivés du moteur électrique[23]

Actuellement, grâce à l'installation d'une fonderie fonte, les moteurs sont intégrés à 100% pour le diesel et l'électrique[24] et à plus de 65% pour celui à essence.

Nous constatons ainsi que par des efforts progressifs et constants, la SIMEF est passée du simple montage à la définition des machines puis à la conception et à la réalisation par ses propres moyens,non seulement des produits finis mais également de certaines machines entrant dans leur fabrication et qui n'étaient pas prévues dans les contrats de licence. Croissance progressive, volonté et efforts constants pour maîtriser, adapter la technologie transférée et surtout innover, voici les points forts de l'approche adoptée par la SIMEF.

Cette maîtrise et cette capacité d'innovation lui confèrent un poids plus grand dans la négociation de futurs contrats de transferts de technologie. Ce qui lui permettra d'obtenir des conditions plus favorables.

Au terme de cette partie, on constate que la priorité est donnée par les pouvoirs publics à la croissance des investissements directs nationaux et étrangers afin de créer un tissu industriel plus dense, de faire face à une demande d'emploi de plus en plus forte et d'équilibrer la balance des paiements. L'aspect technologique n'est invoqué qu'incidemment, c'est ce qui explique l'absence d'une politique de contrôle spécifique aux transferts de technologie.

II - L'absence d'une politique de contrôle des TT.

Ayant pris conscience que la technologie est une variable du développement, certains pays en développement se sont dotés d'un arsenal juridique destiné à contrôler le commerce de la technologie[25]. Le but de ces législations est l'institution de mécanismes juridiques pour le contrôle des contrats de transfert de technologie et notamment des clauses restrictives ou abusives contenues dans ces contrats. A cet effet des organismes ont été créés avec pour mission d'examiner et d'approuver toute importation de techniques, de concession de licences ou de marques.

Tels que des tronçonneuses, des moteurs de machines à coudre.

Bulletin de l'ODI n● 24, Décembre 1988 p. 17

Cas des pays du Pacte Andin, du Mexique, de l'Argentine, du Brésil, de la Corée du Sud, de l'Espagne, du Portugal, de l'Inde, de l'Egypte, de l'Algérie, du Nigéria.

Généralement, ces lois prohibent les clauses relatives aux achats liés, restreignant le volume d'activité, interdisant l'utilisation d'autres procédés, allongeant démesurément la durée de la licence, fixant des rémunérations excessives, ou dont l'objet concerne l'acquisition d'une technologie obsolescente ou inadaptée aux besoins du pays.

On remarque ainsi que les dispositions législatives mises en oeuvre par ces pays peuvent aller du simple contrôle de police à un contrôle d'opportunité du transfert.

Le Maroc, quant à lui, a opté, pour un temps, pour un contrôle indirect (A). Celui-ci n'a pas pour autant entamé la liberté des entreprises marocaines, publiques et privées, dans le choix des modalités de transfert de technologie (B). Toutefois cette liberté est relative compte tenu des insuffisances de la capacité d'absorption technologique (C).

A - Des contrôles indirects.

Les modalités juridiques de contrôle ayant plus ou moins des incidences technologiques sont nombreuses et variées.

Outre les conventions d'investissement que nous avons brièvement étudiées, nous pouvons citer la loi de 1970 régissant la normalisation industrielle[26] dont l'objectif est la recherche de la qualité et de l'amélioration de la productivité. De même nous pouvons citer les textes de 1976 relatifs aux marchés publics qui imposent une procédure déterminée pour le choix des soumissionnaires et des obligations spécifiques à la charge du cocontractant.

Nous nous limiterons dans ce qui suit à l'analyse des textes imposant des conditions à l'exercice de certaines activités par le capital étranger d'une part et à ceux prévoyant un contrôle des changes d'autre part. Les premiers présentent un intérêt indéniable eu égard à l'ampleur des activités concernées et à leur impact sur la restructuration du capital et de l'encadrement des entreprises détenues par les étrangers. Les seconds touchent directement notre sujet.

1● Le contrôle de la propriété privée étrangère

Attachés au libéralisme économique, les responsables n'ont pas voulu édicter des mesures de nationalisation radicales. Ils ont préféré s'orienter vers une politique plus souple de marocanisation de certaines activités économiques. Des textes adoptés dans ce sens découle une formule libérale de restriction de l'emprise du capital étranger.

Les premières mesures consistaient à faire racheter par l'Etat les concessions des services publics accordées, durant le Protectorat, au profit de sociétés françaises (l'émission de la monnaie, l'exploitation des chemins de fer, la distribution de l'énergie électrique).

Dh 1 - 70 - 157 du 30/07/1970 relatif à la normalisation industrielle.

Dans une deuxième étape, et afin d'associer le capital privé marocain, les pouvoirs publics ont préféré agir de façon pragmatique, par la persuasion. Cependant, si les détenteurs étrangers du pouvoir économique ont généralement accepté la participation des marocains, celle-ci ne dépassait pas les 5% du capital.

Face à cette situation, l'Etat est passé à un degré supérieur en exerçant de fortes pressions, revêtant dans bien des cas la forme d'ordres verbalement exprimés, jusqu'à ce qu'une loi soit promulguée en 1973. Le but était de permettre le contrôle par les nationaux des leviers de commandes économiques, et par la même occasion, de donner une impulsion au mouvement d'investissements. Elle permettrait par le travail quotidien dans la gestion conjointe de l'entreprise, de faciliter les transferts de technologie au profit du personnel marocain.

La loi dispose en effet que certaines activités ne peuvent être exercées que par des personnes physiques ou morales marocaines[27].

Cependant, cette marocanisation ne concerne pas toutes les activités. Celles qui sont visées appartiennent principalement au secteur commercial et accessoirement au secteur industriel, tels que les B.T.P., les industries du cuir, du bois, du liège...

Outre cette limite de leur champ d'application, les textes de 1973 pèchent par des lacunes en ce sens qu'ils portent en leur sein les moyens de les détourner des objectifs fixés. Il en est ainsi des participations en cascades, de l'attribution, avant la réalisation de l'opération, d'actions de priorité, de l'éparpillement des actions à marocaniser. Lors du fonctionnement de l'entreprise marocanisée, les actionnaires étrangers peuvent constituer une minorité de blocage.

Mais ce qui est important à souligner ici, c'est que même si la loi impose une participation marocaine paritaire au capital des sociétés et majoritaire au conseil d'administration, le pouvoir économique n'est pas nécessairement partagé. Les propriétaires étrangers peuvent conserver le contrôle du fonctionnement de l'entreprise marocanisée par le biais des mécanismes de gestion et de la maîtrise de la technologie. Au niveau de la gestion, les postes techniques stratégiques restent occupés par des cadres étrangers[28]. Le contrôle par la technologie exercé par les FMN

Les personnes morales marocaines au sens de la loi sont :

- Sociétés anonymes dont la moitié du capital au moins appartient à des personnes physique marocaines ou à des personnes morales marocaines de droit public ou de droit privé et dont la majorité des membres du conseil d'administration, le président de ce conseil et, le cas échéant, l'administrateur délégué sont des personnes physiques marocaines.

- Sociétés civiles à responsabilité limitée ou en nom collectif dont tous les associés sont des personnes physiques marocaines.

- Sociétés en commandite, à condition que tous les commandités soient des personnes physiques marocaines et qu'ils détiennent plus de la moitié du capital social.

Cf. Ch. A. Michalet : transfert de technologie par les FMN, OCDE, 1977, p. 47. A. Berrada : La CGE Maroc. in Etudes sur le secteur industriel, 1988, p. 119.

est encore plus frappant. En effet, les filiales marocaines des FMN ne peuvent pas se passer du flux d'informations technologiques qu'elles entretenaient avec leurs maisons mères. Dans la mesure où celles-ci sont les initiatrices et les réalisatrices du projet et comme elles gardent jalousement le secret sur les procédés de fabrication et le savoir faire, elles restent les véritables détentrices du pouvoir à l'intérieur de l'entreprise. Dans une enquête sur les transferts de technologie par les FMN au Maroc, Michalet souligne la permanence des contacts entre ces firmes et leurs filiales[29]. Les liens étroits sont dictés par la nécessité dans laquelle se trouvent les filiales de se référer, pour tout ce qui concerne l'aspect technologique, à la société mère.

L'importance de la technologie en tant que moyen de contrôle fait que les FMN qui la fournissent n'ont plus besoin d'avoir des participations financières majoritaires. Ce qui explique pourquoi les sociétés à capitaux étrangers non visées par la loi de 1973 ont cherché, après cette date, l'association avec certains groupes marocains. Ce facteur joint à la politique de libéralisation de l'économie dans le cadre du PAS, ont abouti à l'abrogation des décrets d'application de la loi sur la marocanisation en janvier 1990[30].

2● Le contrôle des changes.

En l'absence de toute réglementation spécifique aux transferts de technologie, et par le fait même que ces derniers donnent lieu à rémunération au profit du fournisseur non résidant, l'Office des Changes était amené à exercer un certain contrôle sur les contrats qui s'y rapportent.

Or ce contrôle, l'Office des Changes l'exerçait en se basant sur son pouvoir général de contrôleur des changes avec l'extérieur, pouvoir qu'il tire de son dahir de création de 1958. De ce fait, cet office ne peut être assimilé aux organismes créés par les pays cités précédemment.

Le contrôle se faisait sous l'optique de la sortie des devises et ne concernait qu'indirectement les autres problèmes générés par les transferts de technologie. Il a été exercé pendant une trentaine d'années, sans aucune codification.

Ce n'est qu'en février 1990 qu'une circulaire relative à l'assistance technique a été adressée aux banques[31].

Cette circulaire a eu une durée de vie trop courte puisqu'elle fut abrogée tacitement par une autre en 1992[32]

Ch. A Michalet, op. cit, p. 59.

Décret 2 - 89 - 567 du 8/1/90 abrogeant le décret 2 - 73 - 22. du 8/5/73, relatif à l'exercice de certaines activités. B.O. 4029 du 17/1/90, p.58.

Circulaire n● 1545 du 22 fév 1990 relative aux opérations d'assistance technique étrangère, fev 1990.

Circulaire n● 1587 du 27 Août 1992.

a - Les deux circulaires donnent une définition très large de l'assistance technique. Elles distinguent entre celle qui est durable, continue et celle qui est ponctuelle ou occasionnelle.

L'assistance technique durable et continue concerne les transferts de technologie liée à la propriété intellectuelle (concession de brevet, licences d'exploitation, marques de fabrique, d'enseigne, de design, de savoir faire).

Quant à l'assistance technique ponctuelle et occasionnelle elle regroupe l'engineering sous toutes ses formes (études, expertises, analyses), les contrats clés en mains, la maintenance, la formation professionnelle.

Les modes de rémunération sont également très variés. Les circulaires mentionnent "les plus usuels". La liste n'est donc pas limitative. Il s'agit pour l'A.T. continue de la rémunération au pourcentage basée sur le chiffre d'affaire ou sur la valeur ajoutée et payable par trimestre, semestre ou année. Pour l'A.T. ponctuelle, la rémunération est généralement forfaitaire.

b - la similitude entre les deux textes s'estompe en ce qui concerne les modalités de transfert de redevances. C'est à ce niveau que nous pouvons avoir une idée sur l'attitude adoptée par l'office des changes depuis sa création jusqu'en 1990.

Avant cette date, le régime commun était l'obligation d'obtenir au préalable une autorisation pour tout transfert de redevances d'A.T.

Le principe de base qui guidait l'office est que l'autorisation ne peut être accordée que si " le potentiel technologique local ne répond pas à la demande exprimée en la matière et que le recours à l'assistance étrangère est susceptible d'avoir un impact favorable sur l'économie, notamment sur la création d'emplois, la formation professionnelle, la revalorisation des ressources locales, le développement des exportations..."[33].

De façon plus détaillée, l'office a élaboré des critères d'appréciation. C'est ainsi que pour l'A.T continue, il évalue le coût de la redevance et de ses composantes tels que les frais de recherche scientifique et technique, le coût de communication de la documentation et du know-how, le coût de la formation et l'utilisation des brevets et marques. Les exigences sont moins contraignantes lorsqu'il s'agit de l'AT ponctuelle. L'appréciation se fait sur la base des barèmes de facturation, de la nature et de l'étendue des moyens humains et matériels à mettre en oeuvre par le prestataire étranger.

Depuis 1992 et dans le cadre de la mise en place de la convertibilité du dirhams[34] ., l'autorisation préalable est supprimée Les banques ont reçu délégation pour le transfert des rémunérations dûes au titre de l'assistance technique.

Circulaire 1545.

A. Lakhdar et B. Nourredine : la convertibilité du dirhams, op. cit, p.54.

A cet effet, elles doivent uniquement s'assurer que les paiements sont conformes aux clauses des contrats et que les impôts ont été réglés. Elles ne peuvent donc exercer un contrôle d'opportunité du transfert de technologie. Leur rôle se limite à conseiller les entreprises sur la réalité des prestations fournies et sur le juste prix.

Il ressort de ce qui précède qu'une politique globale et précise des transferts de technologie n'a pas vu le jour. S'il existe par ailleurs un Office Marocain de la Propriété Industrielle, il se borne à enregistrer les brevets et les marques de fabrique.

Dans leur quête de la technologie, les entreprises marocaines sont ainsi libres de choisir les modalités de son transfert.

B - Les modalités du Transfert de Technologie.

Ces modalités sont très variées. Ainsi, il existe les contrats d'ingineering, d'achats d'ensembles industriels, de licences de brevets, de savoir-faire, de sous-traitance internationale, d'assistance technique etc...

Pour le cas marocain, nous analyserons, les contrats d'achat d'ensembles industriels en premier lieu et les accords de licence en second lieu. Cette distinction se justifie dans la mesure où ces contrats comportent souvent des clauses se rapportant aux autres modalités.

1● L'achat d'ensembles industriels.

Les ensembles industriels peuvent être livrés "clé en mains", "produit en mains" ou "marché en mains". La différence entre ces modalités réside dans les obligations du fournisseur.

Dans le contrat clé en mains, ce dernier doit fournir l'unité industrielle en parfait état de marche. Pour ce faire, généralement, il prend la responsabilité totale de la construction et garantit le fonctionnement, le rendement et la consommation. Il doit fournir à l'acquéreur les plans et la documentation. Dans certains marchés qu'on appelle "clé en mains lourd", le vendeur doit assurer la formation du personnel dans ses usines. C'est le cas, entre autres, des contrats de construction des sucreries.

Depuis l'indépendance, le Maroc a eu souvent recours à ce type de contrats[35]. Il en est ainsi des différentes unités créées à l'initiative du BEPI, de celles réalisées dans le cadre des programmes phosphatier, cimentier, sucrier.

Bien qu'elle offre l'avantage de l'installation d'une unité opérationnelle dans des délais rapides, la formule clé en mains présente par contre plusieurs inconvénients : coût de l'investissement élevé, impossibilité de choisir de manière détaillée les différents équipements, faible contribution des entreprises locales, difficulté de disposer des plans de détails et des documents nécessaires à la maintenance des équipements.

Certaines entreprises ont choisi la formule des contrats produits en mains dans lesquels, le constructeur s'oblige à mettre l'acquéreur en mesure d'exploiter lui-même l'unité industrielle avec son propre personnel. C'est en d'autres termes une obligation de résultat et non de moyens.

De là découlent les spécificités de la procédure de réception par l'acquéreur. En effet, dans le contrat clé en main, la réception provisoire de l'ensemble industriel entraine le transfert de la propriété ainsi que les risques qui en découlent[36]. Elle marque le commencement de la période de garantie qui prend fin à la réception définitive.

Celle-ci n'est déclarée, dans les contrats produits en main que si, en plus de la construction de l'usine et l'installation du matériel, les prestations à caractère intellectuel sont réalisées. Il s'agit de la cession des droits de propriété intellectuelle, de la formation du personnel, de l'assistance technique. Après la réception définitive, le constructeur est libéré

M. GERMOUNI, op. cit et N. Taj : L'accession à l'indépendance technologique, Okad, Rabat 1989.

"Le transfert de propriété des installations du constructeur au maître d'ouvrage se fera à la réception provisoire des installations. Ce transfert de propriété sera constaté par l'établissement d'un procès-verbal qui sera signé contradictoirement au plus tard quinze jours calendaires après la date d'obtention des performances garanties des installations". Art. 7 du contrat OCP - consortium européen cité par M.A. BENI Azza, op. cit, p. 388.

responsabilités.

Plusieurs sociétés privées ont conclu des contrats de ce type. On peut citer les contrats Laiterie de Fès - Alfa Laval, Somatrel - Tréfileries et Ateliers de commercy ; Avicom - Société Durand[37].

Le contrat marché en mains peut être considéré comme le prolongement logique du contrat produit en mains. En plus des prestations contenues dans ce dernier, le fournisseur s'engage soit à octroyer une partie du marché qu'il détient pour écouler le produit fabriqué ; soit à assister l'acquéreur à obtenir un label de qualité délivré par l'organisme officiel afin d'améliorer les conditions de commercialisation[39] ; soit à racheter tout ou partie de la production[40]; soit enfin, il peut s'engager à concéder la représentation pour le Maroc de certains produits qu'il fabrique[41].

Quelle que soit la formule choisie (clé en main, produit en main ou marché en main), l'acquéreur est souvent obligé de signer des contrats parallèles définissant les conditions d'acquisition du savoir-faire (licence de brevet ou de know-how).

2● Les contrats de licence.

On distingue généralement les technologies protégées par la loi (brevets) et celles protégées par le secret (know-How)). Les conditions de leur cession ne sont pas, dans la plupart des cas, semblables.

Le donneur de licence garantit au maître d'ouvrage ou à l'acquéreur une jouissance paisible des droits cédés. Ce dernier est ainsi protégé contre toute action dirigée contre lui par des tiers qui pourraient disposer de droits. C'est le fournisseur qui supporte tous les frais résultant de l'action[42].

Dans certains contrats, le bailleur de licence garantit la communication des perfectionnements aux "licenciés". Mais souvent on assiste à l'inverse. L'acquéreur s'engage à mettre au courant le bailleur non seulement des problèmes posés par

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Contrats cités par MM Beni Azza et Sebti. op. cit.

Contrat modulec - Unic Industries.

Ex Maroc conserves - France conserves.

Ex Batano - Maghreb amortisseurs.

Ex contrat Avicom-Durand et Somatrel - Tréfileries de Commercy.

l'utilisation du brevet mais aussi des innovations et des améliorations techniques qu'il a apporté à la technologie objet du contrat de transfert. Cette clause ne caractérise pas uniquement les accords passés entre les filiales et leurs sociétés mères[43], on la retrouve également dans plusieurs contrats de licence passés entre des sociétés indépendantes.

L'obligation principale de l'acquéreur est le paiement de redevances. Au Maroc, comme il ressort des circulaires de l'Office des Changes, les modes de détermination des prix sont nombreux. Ils peuvent être fixes, variables ou mixtes.

Les redevances fixes peuvent être réglées en espèces (ex contrats Maghreb amortisseurs ou Laiterie de Fès) ou en nature, c'est à dire que le fournisseur de la technologie reçoit en contrepartie des actions de la société bénéficiaire (ex H.E.S. C3M).

Les redevances variables sont déterminées soit en fonction du chiffre d'Affaires (Contrat maggy Rouff-Sté Challenge)[44], soit en fonction de la valeur ajoutée.

Les rémunérations mixtes comportent un paiement initial plus un pourcentage sur le chiffre d'affaires.

Ce dernier type de paiement illustre parfaitement la surfacturation qu'on reproche aux fournisseurs. On leur reproche aussi d'allonger la durée de perception des redevances qui peuvent dépasser les vingt ans, durée légale de la protection du brevet au Maroc.

C'est dire à quel point la liberté des sociétés marocaines dans la négociation des contrats peut être relative. Ces contrats sont en fait le résultat d'un rapport de force.

Dans une conjoncture économique morose, les acheteurs peuvent bénéficier d'une situation de concurrence entre les sociétés détentrices de la technologie. Ainsi certains pays, dans leurs appels d'offre pour l'achat de matériels militaires, de trains à grande vitesse ou de centrales téléphoniques exigent diverses compensations économiques et de coopération industrielle illustrées par des retours sur investissement et un transfert de

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Voir en ce qui concerne les filiales marocaines des FMN : Ch. A. Michalet, op. cit. Pour le cas de la C.G.E. Maroc, selon les termes des contrats d'assistance technique passés avec sa société-mère :
"les sociétés assistantes auront le droit exclusif, gratuit et sans limitation de durée d'exploiter ailleurs, qu'au Maroc les perfectionnements, améliorations et tours de main qui lui auront été communiqués par la C.G.E. Maroc relativement aux produits contractuels. Elles pourront les protéger à leur nom et à leur frais, dans les pays de leurs choix autres que le Maroc" A. Berrada, in études sur le secteur industriel, op. cit p. 141.

D'après A. Berrada, dans le secteur pharmaceutique, les redevances s'élèvent à 7% de la valeur du produit sorti d'usine. "l'économie marocaine à l'épreuve de la dépendance technologique" in les enjeux de la coopération en Méditerranée occidentale p. 383. A.E.M. CGEM 1992.

technologie sous forme de sous traitance, de formation[45]. Ces transferts peuvent favoriser un saut vers la maîtrise technologique. Mais cela ne peut être possible sans l'existence d'une capacité d'absorption technologique.

C - Les insuffisances de la capacité d'absorption technologique.

La capacité d'absorption technologique du Maroc peut être évaluée par sa structure industrielle, la taille de son marché, la sophistication de la demande, le niveau de la Recherche - Développement[46] et la politique de la formation.

Nous avons déjà dit quelques mots sur les trois premiers déterminants et nous avons constaté que l'une des causes de l'essoufflement de la stratégie d'import-substitution est justement la faiblesse de la demande locale.

Nous examinerons ci-après les deux autres paramètres, en l'occurrence la politique de formation et surtout l'état de la Recherche-Développement dans la mesure où les technologies transférées ne deviennent autochtones que dans les pays où le niveau scientifique est assez élevé pour pouvoir assimiler l'essentiel du savoir théorique et pratique qu'elles impliquent.

Or si l'éducation et la formation des cadres ont été érigées en priorité dès le début des années 60, la recherche scientifique n'a pas eu la même faveur.

1● L'effort de formation

Compte tenu de la situation qui prévalait au lendemain de l'indépendance et aux moyens dont dispose le pays, l'effort de formation des cadres est très important. Actuellement il existe 13 universités comprenant des facultés, des écoles d'ingénieurs et des écoles supérieures de technologie. Le pôle non universitaire regroupe des écoles normales supérieurs, des écoles d'ingénieurs, des centres de formation de formateurs. L'effectif des enseignants-chercheurs (7063) a plus que triplé de 1980 à 1993. 53% d'entre eux exercent dans les facultés des sciences et les écoles d'ingénieurs.

Cette croissance a engendré une multiplication du nombre des laboratoires de recherche qui s'élève à 283 dont 66 % (187) en sciences exactes et expérimentales[47].

Ces laboratoires contribuent à parfaire l'apprentissage des étudiants par le biais des

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Cf N. Bayle : "Le redoutable jeu des transferts de technologie", problèmes économiques n● 2326 du 13 mai 1993 p. 25.

Michalet Ch. A, op. cit, p 51.

Ben Sari D.: "Politiques nationales de la Recherche", communication présentée aux assises francophones de la Recherche. Agadir, 26-27 Avril 1993.

Ces laboratoires contribuent à parfaire l'apprentissage des étudiants par le biais des travaux dirigés et de l'expérimentation. Ils sont le lieu par excellence de formation par et pour la recherche. Si les étudiants de 3ème cycle en sciences ne représentent que 12,5 % du total (15 000), ils sont plus de 40 % à soutenir des mémoires de diplôme d'Etudes Supérieures et 38,4 % des thèses d'Etat.

Si donc un effort louable a été fourni, les lacunes et les insuffisances du système d'enseignement supérieur restent nombreuses. On lui reproche généralement son caractère inadapté. Le contenu des programmes ne change pas pour pouvoir suivre l'évolution rapide de l'environnement économique et social. Malgré les créations récentes, le nombre actuel de facultés reste très en deçà des besoins. Ce qui entraîne une surcharge préjudiciable à un enseignement de qualité. Ainsi le ratio d'encadrement est d'1 enseignant pour 23 étudiants dans les Faculté de Sciences, et de 1/63 dans les Facultés de Droit et d'Economie. Dans de nombreux établissements la charge d'enseignement accapare toute l'activité de l'enseignant[48]. On constate par ailleurs une sorte de dualisme dans l'enseignement supérieur avec d'un côté des instituts et écoles spécialisés d'accès difficile, formant des ingénieurs, de l'autre côté des facultés devant faire face à un nombre de plus en plus croissant d'étudiants, sans qu'elles disposent de moyens humains et matériels adéquats. En effet, les budgets de fonctionnement et d'investissement de l'enseignement restent très insuffisants pour pouvoir répondre aux besoins qui s'accroissent.

N'étant pas équipée pour prodiguer un enseignement à la hauteur des défis économiques et technologiques, l'Université n'arrive pas à produire le personnel nécessaire à la recherche productive.

2● L'absence d'une stratégie de la recherche scientifique et technique.

L'importance de la recherche scientifique et technique n'est plus à démontrer. Un chiffre à lui seul illustre cette évidence. Dans les pays de l'OCDE 50 % de la croissance du PIB résultent de l'évolution technologique et de leur effort en recherche développement[49]. Le rôle primordial de la Recherche Scientifique et Technique est mis en valeur par le Plan d'orientation 1988 - 1992[50].

T. Bennani, A. Maslout et R. Belmokhtar :"réflexions sur la gestion de la recherche scientifique au Maroc" : Actes de la 1ère rencontre sur les transferts de technologie par les scientifiques marocains expatriés, 5 - 8 juillet 1993.

D. Ben Sari, op. cit.

On peut lire dans le plan d'orientation (88 - 92) que "la science et la technologie sont devenues les moteurs de l'évolution du monde. Elles sont également objet de fierté nationale et se situent au centre des enjeux stratégiques internationaux. Cependant, l'expérience a montré que la technologie ne s'achète pas. Elle se maîtrise nécessairement par le développement de la recherche, et de l'ingénierie..." p. 115.

C'est à la suite des différentes conférences sur la science et la technologie organisées par l'UNESCO tout au long des années 1970, que les pays en développement ont pris conscience du caractère urgent de la mise en place de structures de recherche comme facteur essentiel dans le processus du développement technologique.

Le Maroc a créé dès 1962 un Centre universitaire de recherche scientifique chargé de la coordination et de la formation des chercheurs. Mais il n'a jamais pu être opérationnel en raison d'un statut inadapté à la mission qui lui était assignée.

Devant cette lacune, et dans un effort d'amélioration, le Centre National de Coordination et de Planification de la Recherche Scientifique et Technique fut créé en 1976. On peut résumer sa mission, très vaste, en disant qu'il est chargé de coordonner, planifier, orienter et développer les recherches scientifiques et techniques de tous ordres. Il est donc amené à fixer les priorités nationales, à établir les programmes et à coordonner les projets de recherche entrepris par les secteurs public et privé.

A cet effet, il a commencé par inventorier le potentiel scientifique et technique. Il a également élaboré un schéma directeur fixant des axes prioritaires de recherche.

En ce qui concerne la recherche proprement dite, des laboratoires furent créés pour réaliser des recherches dans les disciplines non couvertes par les laboratoires existants dans les universités et autres instituts.

Le Centre se veut enfin un interface entre la recherche et les secteurs de production.

Cependant, il faut souligner qu'il ne suffit pas de créer des organismes de politique scientifique, si par ailleurs les moyens de mise en application des objectifs font défaut. Le Centre souffre en effet d'une insuffisance chronique des ressources financières et humaines entravant l'accomplissement de toutes les missions qui lui ont été dévolues. Bien que le dahir de création impose aux facultés et autres institutions de recherche de collaborer avec le centre, celui-ci n'a pas de pouvoir de décision à l'égard des organismes publics de recherche ni à fortiori des organismes privés. Bien qu'établissement public, il est soumis à des règles et procédures budgétaires contraignantes et inadaptées eu égard à la souplesse qui doit caractériser la gestion de la recherche. Enfin il ne dispose pas d'un statut propre du chercheurs , de sorte que le personnel suit un plan de carrière semblable à celui des enseignants chercheurs. Or on sait que ce statut n'est pas incitatif puisque le recrutement et l'avancement qu'il prévoit dépendent de l'ancienneté et non du mérite et du rendement. En outre, l'absence d'un statut propre aux chercheurs n'autorise pas leur mobilité entre leur établissement d'une part et les universités, les établissements de formation de cadres et les entreprises d'autre part.

En fait ces limites caractérisent la plupart des institutions de recherche qu'elles soient universitaires ou relevant de ministères techniques.

L'absence de politique scientifique[51], l'insuffisance des moyens[52], l'inexistence d'une stratégie de la maintenance du matériel disponible[53], la prédominance de la recherche fondamentale, tous ces facteurs constituent des obstacles de taille à l'épanouissement de la R.S.T. au Maroc. Par ailleurs les liens avec les secteurs de la production, notamment industriel, sont ténus. Certes, on constate un certain développement des relations dans le cadre de recherches contractuelles. Mais il faut remarquer que celles-ci concernent surtout la chimie et la géologie qui s'accaparent 80% du total. Paradoxalement, ces relations sont quasiment inexistantes à Casablanca[54].

Dès lors, incapables de nouer des liens de collaboration avec les entreprises, les institutions de recherche marocaines établirent des relations avec leurs homologues européennes et américaines. Il en résulte souvent une recherche orientée vers la satisfaction des priorités étrangères. Cette situation est d'auta ne plus préjudiciable que la recherche n'est plus ce qu'elle était auparavant, indépendante et désintéressée. L'universalisme qui était son caractère principal est de plus en plus entamé.

En effet, actellement , les pays développés fondent leur croissance économique sur la science et la technologie. Les résultats de la recherche scientifique sont de plus en plus gardés secrets ou font l'objet d'une protection légale par le biais du brevet. C'est ainsi que des brevets sont délivrés à des plantes créées dans le cadre de la recherche en biotechnologie. Bien plus le droit à la protection légale a été reconnue à des espèces vivantes manipulées génétiquement[55].

Il ressort de ce qui précède que si la coopération avec l'étranger dans le domaine de la recherche est souhaitable et même nécessaire, il faut d'une part s'interroger sur les termes et les conditions de cette opération, et d'autre part réorienter cette coopération vers l'objectif de maîtrise et d'innovation technologiques.

Le plan 88 - 92 ne dégage pas de priorités claires et des objectifs précis et ne prévoit pas de budget spécifique pour la recherche.

Le Maroc consacre, environ 0,3 % de son PNB à la R.S.T. ce qui est très en déca du minimum recommandé par les organismes internationaux qui est de 1%.

Cf. Séminaire sur le post investissement 15 - 17 mai 85.

Cf T. Bennani, op. cit, p. 15.

L. Auriol et F. Pham : "les brevets : données et enjeux" Problèmes économiques n● 2336 du 28/7/1993 p. 24.

ANNEX J

COUNTRY REPORT - NIGERIA

Policy and Institutional Framework on Technology Transfer and Development

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1. **INTRODUCTION:**

The Government of the Federal Republic of Nigeria had recognised some years back, the importance and role of technology in enhancing National Economic Development. The Government had in particular recognised the need for supplementing indigenous technology with foreign technology to foster economic and social development.

To attain anticipated economic and social development goals and objectives, the Government adopted a number of policy measures that are geared towards attracting foreign technology and enhancing its assimilation to particular needs and situations.

2. **LEGAL AND INSTITUTIONAL FRAMEWORK:**

In line with this policy, the National Office of Industrial Property Decree No. 70 of 1979 was established as a major Act providing legal and institutional framework for controlling technology transfer in Nigeria. The Office was later renamed a National Office for Technology Acquisition and Promotion (NOTAP). The National Office evaluates all transfer of technology agreements before such agreements are subsequently registered after necessary modifications must have been incorporated to ensure that the agreements comply with the provisions of NOIP Decree. The agreements are screened:

(i) to ensure that they will not be pre-judicial to the National interest.

(ii) to ensure that they will not impose unfair and unjustifiable restrictions or handicaps on the local partners.

(iii) to ensure that the payment of fees (wherever applicable) will be commensurate with the level of technology to be transferred and will not have adverse effects on the balance of payments of Nigeria.

From the inception of the Office (1983-1992), over two thousand agreements had been registered by the Office. By the intervention of the Office in the payment terms of the agreements, over N786.46 million i.e. US $40 million was saved during the period. The sources of technologies indicated that most of the agreements came from U.K and Western Europe, followed by U.S.A.

3. The National Office was established as one of the main instruments to carry out Nigerian Technology Policy. The principal goals of the technology policy are:-

(i) to encourage the flow of technology into the country in order to strengthen the industrial development;

(ii) to encourage domestic enterprises to acquire foreign technologies that may be suitable to indigenous requirements. In this sense, it is considered particularly important that the technology contributes to the creation of employment to fully use Nigerian labour-force;

(iii) to strengthen the negotiating capacity of Nigerians so that they may obtain appropriate technologies on the best terms and conditions, especially concerning prices;

(iv) to assist Nigerian enterprises in the selection of foreign technology;

(v) to achieve a more efficient process for a rapid absorption and assimilation of foreign technology by Nigerian technicians;

(vi) to properly adapt foreign technologies to the requirements of the local market;

(vii) to gradually develop local technologies; and

(viii) to encourage future exportation of the locally developed technologies to other markets; especially those of the neighbouring countries.

4. **RECENT TRENDS AND DEVELOPMENT:**

The conditions of the International Technology markets have dramatically changed since the 1970s; thus approaches of the 70s and the early 80s are no longer valid for the 90s. How to stimulate technology flows from developed to developing countries is the main issue facing policy markers.

The technology market conditions forecast for the 90s are characterised by the following:-

- on the supply side an inelastic market particularly for advanced technology;
- a growing technological protection amongst industrialised countries;
- a shift from licensing activities to the establishment of manufacturing subsidiaries of commercial representation;
- low demand from developing country firms whose manufacturing activities for export have so far been based on static comparative advantages; thus producing low value-added industrial commodities.

In recent years therefore, it has been decided by the Government of Nigeria to play down on the regulatory functions of the Office and to develop NOTAP as an agency for building up indigenous capacity in industrial technology and to assist the country achieve self-reliance in promotion and acquisition of industrial technology leading to effective absorption and adaptation of acquired technology. The National Office is therefore re-orienting its functions from a regulatory and monitoring agency to active promotional role with the help of information and data available within NOTAP in the areas of technology Import and Industrial use.

With the changed role of NOTAP, it has subsequently strengthened its capacity to operate as an information disseminating agency relating to technical, industrial and commercial information needs of the business community. As access to information data base is essential for providing any technical services, it became necessary to link NOTAP with other agencies such as the Federal Institute of

Industrial Research, Oshodi (FIIRO) and the Raw Materials Research and Development Council (RMRDC) within the Federal Ministry of Industry in order to create an information network which will allow each member to supplement the other in providing comprehensive information services to end users. Furthermore, the UNIDO assistance has been aimed at strengthening the technology advisory services primarily through organisational restructuring and the expansion scope of work of these services through active delivery of services to potential entrepreneurs interested in accessing and using technology and the creation of a library of technology and project profiles as well as feasibility studies.

5. **PATENT INFORMATION AND DOCUMENTATION CENTRE (PIDC):**

In line with the new role of the Office, a Patent Information and Documentation Centre (PIDC) has been established for exchange and transfer of patent technological information in the country and therefore in the transfer of technology itself.

The objectives and role of a Patent Information and Documentation Centre (PIDC) is to provide access to technological information contained in patent documents in a manner suited to the needs of the users, that is:

(i) members of the public, particularly those engaged in research and development, and specialist in industrial enterprises;

(ii) the person (examiner) in the industrial property office responsible for judging whether the inventions which are the subject matter of patent application are patentable; and

(iii) private inventors and patent professionals i.e. attorneys, agent or searchers.

6. **CONCLUSION:**

The institutional arrangements for screening foreign technology contracts in the country have been reviewed and made more flexible and the existing trends

in technology transfer policies are towards greater liberalization and flexibility. This is largely because of the increased privatization with respect to new and high technologies.

The National Office for Technology Acquisition and Promotion (NOTAP) has successfully achieved the government objective of regulating the inflow of foreign technology into the country. The Office's diversified role and additional functions have also succeeded in enhancing NOTAP's position as a promotional body with ability to contribute to the formulation and execution of economic and technological policies.

ANNEX K

COUNTRY REPORT - SENEGAL

Policy and Institutional Framework on Technology Transfer and Development

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Depuis la dernière réunion du TIES-Africain tenue à Lagos en Octobre 1991, la situation du Système a sensiblement évoluée au Sénégal. En effet à la suite d'un atelier national tenu à Dakar en Septembre 1991, le Gouvernement du Sénégal et l'Organisation des Nations Unies pour le Développement Industriel (ONUDI) ont mis en oeuvre un projet d'assistance au Sénégal pour le renforcement des capacités dans le domaine de l'acquisition et du transfert de technologie.

Ce projet qui découle des activités relatives au TIES-Africain, vise essentiellement à aider le Sénégal d'une part à former des consultants capables d'examiner et de selectionner les techniques et de mener à bien les négociations correspondantes et d'autre part à mettre en place un programme régulier de formation aux opérations de transfert de technologie au niveau d'une Institution sous-régionale qui est la Communauté Economique de l'Afrique de l'Ouest (CEAO).

Les résultats de ce projet se situaient a deux niveaux:

1°) Assurer, par les experts nationaux, des services consultatifs qui ont pour but d'offrir rapidement des conseils aux chefs d'entreprises sur la négociation de transactions de caractère technique et industriel pour tout ce qui concerne l'acquisition de techniques par contrat ;

2°) Mise en place d'un programme régulier de formation à la négociation en matière de transfert de technologie qui sera conduit à l'avenir de façon indépendante par les experts nationaux.

Pour atteindre ces résultats, le projet a mis en place une équipe pluridisciplianire de cinq experts nationaux qui, après une voyage d'étude a Vienne où ils se sont familiarisés avec les différents services de l'Organisation de Nations-Unies pour le Développement Industriel, ont reçu une formation complémentaire dans le domaine de l'acquisition et de la négociation de contrats de transfert de technologie par l'intermédiaire des consultants internationaux.

Ces experts viennent du Ministere de l'Energie, des Mines et de l'Industrie, de la Société Nationale d'Etudes et de Promotion Industrielle (SONEPI), du Centre Africain d'Etudes Supérieures en Gestion (CESAG), de l'Université Cheikh Anta DIOP et d'un cabinet privé.

Ainsi, l'équipe pluridisciplinaire assistée d'experts de l'Organisation des Nations-Unies pour le Développement Industriel, a mis en oeuvre les deux principales activités du projet que sont les Services Consultatifs et la formation.

1°) Services consultatifs

Une douzaine d'entreprises senégalaises ont été sélectionnées et ont reçu la visite des experts qui ont rencontré les responsables. Plusieurs questions d'ordre technique, financier, juridique etc... ont été abordées lors de ces rencontres.

Pour chaque entreprise visitée, une fiche technique avec les principales préoccupations de l'entreprise a été établie.

Des actions concrètes ont été ensuite engagées par les services consultatifs auprès des services spécialisés de l'ONUDI, de certaines institutions de coopération internationale comme le CDI, la Chambre de Commerce Internationale de Genève etc...

2°) Formation

Les experts nationaux, assistés de consultants internationaux de l'ONUDI, ont animé du 6 au 10 Septembre 1993 à Dakar dans les locaux du CESAG un séminaire qui regroupait des hauts responsables d'entreprises et de l'Administration. Ce séminaire était également ouvert à l'ensemble des autres pays membres de la CEAO.

L'objectif de cette rencontre était de sensibiliser les participants sur un certain nombre d'aspects liées au transfert de technologie :

- aspects précontractuels et techniques de la négociation ;
- aspects contractuels financiers ;
- aspects contractuels juridiques.

En impliquant le CESAG dans l'organisation de ce

séminaire, le Ministère de l'Energie, des Mines et de l'Industrie et l'ONUDI entendent mettre en place au niveau de cette Institution sous-régionale un programme régulier de formation à la négociation des contrats de transfert de technologie à l'intention des chefs d'entreprises du Sénégal et de la sous-région.

Nous pouvons affirmer qu'avec le noyau de cinq experts nationaux spécialisés dans les questions de transfert de technologie, les chefs d'entreprises ont à leur disposition une équipe capable de répondre à certaines de leurs préoccupations liées à l'acquisition et à la négociation de leurs contrats de transfert de technologie.

ENREGISTREMENT DES CONTRATS DE LICENCE

Entre 1992 et 1993, le Service de la Propriété Industrielle et de la Technologie a examiné une dizaine de contrats de licence en vue de leur approbation par le Ministre de l'Energie, des Mines et de l'Industrie, conformément au décret 89 - 1265 du 17 Octobre 1989 fixant les modalités de contrôle et d'approbation préalables des contrats de transfert des droits de propriété industrielle. Ces contrats de licence de marques couvrent essentiellement les domaines suivants :

- fabrication d'alcool ;
- bouillons cubes ;
- bouillons déshydratés ;
- ouates de cellulose ;
- cigarettes ;
- cheveux artificiels.

Pour conclure, nous pensons que le système TIES-Africain ne répond pas encore à l'attente de certains pays. En effet, le système d'échange d'informations technologiques ne s'est pas concrétisé pour que les pays puissent en bénéficier. La présente réunion devrait réfléchir sur les voies et les moyens pour combler cette lacune./-

ANNEX L

COUNTRY REPORT - TANZANIA

Policy and Institutional Framework on Technology Transfer and Development

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INTRODUCTION

The United Republic of Tanzania is a Union between two countries, Zanzibar and Tanganyika which took place in 1964. On the East Coast is bordered by the Indian Ocean and the Northern part is bordered by Kenya and Uganda. The Western border comprises of the countries of Rwanda, Burundi, Zaire and Zambia. The Southern border comprises of Malawi and Mozambique. The country covers a large land area of about 945,000 square kilometres. The population is estimated to be 26,000,000.

ESTABLISHMENT OF SCIENCE AND TECHNOLOGY POLICY MAKING BODY

The Government established the Tanzania Commission for Science and Technology (COSTECH) through Act No. 7 of 1986. The Commission formally became operational in 1988. The Act which established COSTECH also repealed and replaced the Tanzania National Scientific Research Council Act No. 14 of 1968. The main purpose of the new Act was to establish a public organ in the form of a parastatal organisation which could effectively and efficiently coordinate and promote scientific research and technology development in the country and at the same time acting as the Chief Advisor to government on science and technology policy and on all matters pertaining to the development of science and technology and their application to socio-economic development in the country. Outwardly, the functions of the Tanzania Commission for Science and Technology appear very similar and indeed almost identical to those of the Tanzania National Scientific Research Council.

REASONS WHICH JUSTIFIED THE ESTABLISHMENT OF COSTECH

A closer and deeper look into the texts of the two Acts, namely the Tanzania National Scientific Research Council Act of 1968 and the Tanzania Commission for Science and Technology Act 1986, would reveal that there are indeed very significant differences between them. Thus whereas the Tanzania National Scientific Research Council Act 1968 merely stipulated on the functions and

responsibilities of the Council, without providing it with the means whereby such functions and responsibilities could be executed, the Tanzania Commission for Science and Technology Act 1986 goes a step further by providing COSTECH with the means by which it could effectively and efficiently perform its functions.

The main weakness of the Tanzania National Scientific Research Council Act 1968 which hampered the efficiency and effectiveness of the Council, was that the Act was silent as to how the Council was to react with the national research institutes and national universities in the matters relating to the coordination and promotion of scientific research and technology development and to the determination of research priorities. There was no way in which the Council could coordinate the research activities of these institutions or advise on research priorities without being seen to be or being accused of, interfering with the affairs of other national institutions whose terms of responsibility contained no clauses or references as to their relationship with the Council.

The only activity of the defunct Tanzania National Scientific Research Council which was seen by the national research institutes and the national universities as serving useful purpose, was the promotion of scientific research and technology development. The activity took several forms including research grants to individual scientists and research institutes, sponsorship of scientific meetings, conferences, seminars and workshops in the country, assistance to local scientists to attend conference and workshops abroad, publication of research results. The sponsorship of the Tanzania Award for Scientific and Technological Achievements (TASTA) was another activity of the defunct Tanzania National Scientific Research Council which was appreciated by the national research institutes and the national universities.

From the aforegoing it could be seen that whereas the Tanzania National Scientific Research Council was an effective organ for the promotion of scientific research and technology development it was on the other hand not as effective in the coordination of research and technology development. In addition, the Council was not effective as an informed advisor to government on science and technology policy and on priorities in scientific research and technology development. To be able to play the two lat r roles effectively the Council had to have very cooperative links, based on mutual trust and understanding with the national research institutes and the national universities.

Therefore, the establishment of the Tanzania Commission for Science and Technology was meant to provide an effective national organ responsible for the development and application of science and technology in the country which would at the same time be free from the encumbrances and weaknesses inherit in the Tanzania National Scientific Research Council.

FUNCTIONS OF COSTECH

According to the Tanzania Commission for Science and Technology Act of 1986 the functions of COSTECH can be summarised as follows:

- to act as the principal advisor of government on all matters relating to scientific research and technology development.

- to formulate a national policy on the development of science and technology in the country.

- to monitor and coordinate all scientific research and technology development.

- to acquire, store and disseminate scientific and technological information through conferences, symposia, workshops seminars and through publications.

- to advise government on priorities in scientific research, allocation of research funds, regional and international cooperation in scientific research and technology development, training and recruitment of scientific personnel, scientific education and maintenance of scientific standards, national science and technology policy.

- to popularise science and technology at all levels.

COSTECH executes the above functions through its research and development advisory committees which are its main advisory organs.

STRUCTURE OF THE TANZANIA COMMISSION FOR SCIENCE AND TECHNOLOGY

The Parliamentary Act which established COSTECH provided for a structural framework which would bring together, under one forum, and in one cooperative organisation, the top leadership of the scientific and technological community of the country. Hence under COSTECH the scientific and technological talent of the country has been brought together, under one roof, to work jointly, through cooperation and bring science and technology to bear on the socio-economic development problems of the country. The structural framework of COSTECH has been designed and formulated in such a way that all the national scientists and technologists under its umbrella work in cooperation and in real partnership without any one individual or group of individuals assuming a leadership role or imposing on the other individual scientists and technologists or groups of them. Furthermore, all the major national research institutes are through the parliamentary act, affiliated to the COSTECH.

GOVERNING BOARD

The COSTECH Governing Board is known as the "Commission" and is made up of a very widely representative body of senior and

eminent scientists from all sectors of the national economy. Membership of the "Commission" is derived from both the mainland and Zanzibar and includes research scientists from national research institutes, senior academicians from universities and policy makers from government ministries. As expected, the function of the Commission is to give broad directives and guidelines to the secretariat and to its various committees concerning the execution of its functions.

STATUTORY AND NON-STATUTORY COMMITTEES OF COSTECH

COSTECH performs its functions through the following statutory and non-statutory committees:

(a) **Executive Committee**

This responsible for the day to day functions of COSTECH and performs these functions on behalf of the Governing Board.

(b) **Research and Development (R&D) Advisory Committees**

These are sectoral committees of experts established to advise the Commission on how to carry out its mission in the various sectors of the national economy, eg.:

- Agriculture and Livestock
- Natural Resources
- Industry and Energy
- Medicine and Public Health
- Environment
- Basic Sciences
- Social Sciences

(c) **The Tanzania Award for Scientific and Technological Achievements (TASTA) Committee**

Its main function is to encourage and identify scientific talents by recommending to government, through the Commission notable scientific or technological achievements

in the form of discoveries innovations, inventions or adaptations which are of significance in socio-economic development. The successful applicants of the Award are rewarded in the form of Cash Awards, Certificate of Citation and a shield. The conferrement of the Award was in the past given on 1st May of every calender year to commemorate the international Workers Day. However and beginning next calender year the Award would be given to all deserving scientists and technologists on 30 June of every year which coincides with the date declared as the African Science and Technology Renaissance Day.

(d) Research Clearance Committee

COSTECH also has the role of scrutinising applications from foreign researchers who are in need of permits to enable them undertake research in Tanzania. To facilitate execution of this function, a special clearance committee has been established.

DIRECTORATES

For the efficient implementation of its functions and activities, the Tanzania Commission for Science and Technology operates under four directorates:

(i) Directorate of Research Coordination and Promotion

It deals with the coordination of both sectoral and institutional research in the country.

(ii) Directorate of Technology Development and Policy

Its major responsibility is that of maintaining effective links with technological development centres and research institutions in the country with the view of attaining an optimum level of technology development. Another important activity of this directorate is the establishment of a Centre for the Development and Transfer of Technology.

(iii) **Directorate of Information and Documentation**
Its main responsibilities is to collect, process and disseminate scientific and technological information for use by scientists, technologists, policy makers in government ministries and parastatal organisations and the private sector. In addition it has the role also of keeping the general public informed about development in science and technology through mass media etc.

(iv) **Directorate of Administration and Finance**
It provides administrative services to the entire staff of COSTECH such as manpower planning and development, finance, supplies and security.

INTERNATIONAL COOPERATION

Because knowledge and science/technology have no boundaries and in that matter they are international, COSTECH maintains active relationships with several international organisations which support research and development efforts in developing countries. Some of the organisations which have maintained links with COSTECH are Commonwealth Science Council, Pan African Union of Scientists, Third World Academy, International Foundation for Science (IFS), Norwegian Agency for International Development (NORAD), International Development Research Centre of Canada (IDRC), United Nations University etc.

ESTABLISHMENT OF A NATIONAL CENTRE FOR DEVELOPMENT AND TRANSFER OF TECHNOLOGY

In accordance with the Act which established COSTECH, the Commission has been empowered to establish a national Centre for the Development and Transfer of Technology to serve as its principal organ responsible for all matters relating to the development, transfer, adaptation of technology. The Centre when fully established would also be responsible for the choice and

assessment of acquired technology. As it was pointed out somewhere else in this short report, the Directorate of Technology Development and Policy has been given full mandate of coordinating the establishment of this centre. This Centre is being funded by UNDP with UNIDO as an executing Agency. The project has been ongoing for about two years now, and the basic infrastructure has been set out which include the recruitment of staff for the Centre. As of now, the National Expert on Technology Management and Development, Prof. M.S. Sheya who is working for the project has been earmarked to become the Director of the Centre which also plans to absorb all the staff of the directorate of Technology Development and Policy. In addition, other senior members of staff would be employed to fill important posts of Economic Analyst/Financial Analyst, Technical Analyst and Industrial and Technological Information Specialist.

The Centre will be entrusted to carry out the following functions:

(a) technology appraisal;
(b) technology contract registry;
(c) technology services to include industrial and technological information, promotion services, advisory services;
(d) technology monitoring;
(e) technology management;
(f) technology development;
(g) technology policy.

It is expected that the Centre will have to foster its links with national and international institutions concerned with technology transfer and development and policy issues such as UNIDO's Industrial and Technological Information Bank (INTIB).

The long-term goal of the Centre will be to create an enabling environment in Tanzania for the autonomy and for making an independent choice of the right technology, its evaluation and internalisation. It also expects to generate an endogenous capacity for adaptation, innovation and development of sustainable indigenous technologies.

OTHER NATIONAL INSTITUTIONS WHICH DEAL WITH TECHNOLOGY TRANSFER AND/OR DEVELOPMENT

Besides COSTECH and the Centre for Development and Transfer of Technology, there are many institutions or organisations in the country which are directly or indirectly engaged in technology transfer and development. These are:

- Tanzania Industrial Research and Development Organisation (TIRDO)
- Institute of Production Innovation (IPI)
- Metal Engineering Industries Development Association (MEIDA)
- Building Research Unit
- Registry of Patents
- Tanzania Chamber of Commerce, Industry and Agriculture
- Confederation of Tanzania Industries
- Investment Promotion Centre (IPC)
- Tanzania Engineering and Manufacturing Organisation (TEMDO)
- Centre for Agricultural Mechanization and Rural Technology (CAMARTEC)
- Tanzania Bureau of Standards
- Bank of Tanzania
- Tanzania Forestry Research Institutes
- National Construction Council
- Tanzania Food and Nutrition Centre
- Ubungo Farm Implements
- Tanzania Investment Bank
- Mangula Mechanical & Tools Manufacturing Company
- National Engineering Company
- Guru Engineering Works
- Jandu Industries Ltd
- TANALEC (Electrical Equipment Manufacturing)
- Zana za Kilimo Mbeya (Farm implements)
- Small Industries Development Organization (SIDO)
- Department of Agricultural Engineering, Sokoine University of Agriculture
- Department of Research and Training, Ministry of Agriculture and Livestock Development.

Among all the institutions named above the Tanzania Industrial Research and Development Organisation (TIRDO) deserves some detailed description viz.:

It is the national focal point for UNIDO's INTIB ie. Industrial and Technological Information Bank. TIRDO is a parastatal organisation affiliated to COSTECH. The Chief Executive of TIRDO is also a member of the "Commission" and is the Chairman of COSTECH's Research and Development Advisory Committee on Industry and Energy. It was established to conduct research and offer consultancy services to industry. In its activities emphasis is placed on the use of locally available resources and locally fabricated resources.

Some of the services offered by TIRDO to industry include:

(a) an instrumentation centre which provides services and expertise in the repair and maintenance of various instruments as well as testing facilities;

(b) a chemical laboratory, which is equipped with analytical instruments and can provided analytical services on various materials;

(c) energy management centre, which has the experience and expertise to offer advice on the efficient use of energy;

(d) materials testing laboratory offering a range of materials etc.

NATIONAL SCIENCE AND TECHNOLOGY POLICY

The National Science and Technology Policy was formulated in 1985. The National Science and Technology Policy enunciated in 1985 spelt out directions towards which science and technology could be developed and utilized more efficiently and effectively in key sectors of the Tanzanian economy. However, since its enunciation certain weaknesses have been noticed in the Policy with the result that efforts are now underway to revise this Policy with a view to ensuring that it meets the present changing

conditions of the country's social economic transformations. To revise the present policy, the Ministry of Science, Technology and Higher Education in collaboration with COSTECH are organising a meeting of national experts in S&T to convene in the Northern town of Arusha from 18 - 22 October, 1993 to consider and deliberate on the proposals to be included in the revised policy document.

CONCLUSION

In view of the mandate which COSTECH has been given by the Government on the matters pertaining to the development of Science and Technology in the country, we consider that COSTECH is the most appropriate and right national institution to be the National Focal Point for the African TIES project.

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ANNEX M

COUNTRY REPORT - TUNISIA

Policy and Institutional Framework on Technology Transfer and Development

Document 1: Apeçu sur les caracteristiques du tissus industriel tunisien

Document 2: Les stratégies à longterme et le développement institutionnel dans le domaine de la technologie et la recherche scientifique

Document 3: Annexe au document 2: Les attributions du Secretariat d'Etat à la recherche scientifique et de la technologie

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Ao. Khereddine Pacha
Tunis

MINISTERE
DE L'ECONOMIE NATIONALE

N° Document 1.

L'ENTREPRISE ECONOMIQUE : RECHERCHE ET TECHNOLOGIE

I / Caractéristiques Générales du Tissu Industriel :

Le Tissu industriel que constituent ces entreprises présente les caractéristiques d'ordre général et structurel suivantes :

1-1 Caractéristiques Générales :

* Taille des PMI relativement faible.

* Dualisme : Dichotomie entre les PMI totalement exportatrices et celles travaillant pour le marché local : pas d'échange et pas de lien économique entre elles.

* Faiblesse de l'intégration verticale et horizontale :

  - Intégration verticale : A l'exception de certaines industries telles que les Matériaux de Construction ciments, chaux et les industries chimiques des Phosphates et Dérivés, le degré d'intégration vertical pour les Textiles, qui compte pour l'essentiel de la valeur ajoutée qu'il procure au pays (plus de la moitié des emplois de l'industrie manufacturière, appartiennent à ce secteur) demeure faible (Importation encore de fils et filés de coton et de tissus). Il en est de même du secteur des cuirs et des chaussures :

(importation de plusieurs qualités de cuir).

- Intégration Horizontale :

Cette faiblesse d'intégration horizontale est liée à la structure économique du pays : (sous - traitances de capacité ou de spécialité, insuffisantes, et parfois absentes pour certains secteurs).

* Entreprises, longtemps protégées :

Prix homologués n'encourageant pas l'amélioration de la qualité, la réduction des coût et par voie de conséquence la compétitivité.

1-2 Caractéristiques Structuelles:

- Dépendance Technique : Matériels et Equipements, Appareillages d'essai, de contrôle, importés de l'Etranger qui veut bien fournir ce qu'il veut en technologie.
- Vétusté du Matériel : Acquisition de Matériel de production la plupart du temps de réemploi, reconditionné, et de durée de vie aléatoire.
- Qualification du Personnel : Taux d'encadrement technique trés faibles; absence de spécialisation dans certains domaines (Voir taux d'encadrement par secteur industriel en Annexe I.

A côté de ce tissu de PMI il existe bien entendu des entreprises performantes, de taille critique suffisante pour appréhender la maîtrise de leur outil de production en se dotant d'un encadrement technique satisfaisant. On en dénombre quelques unités par secteur d'activité et elles appartiennent aussi bien au secteur public que privé. Ce sont des industries d'infrastructure, capitalistiques et structurantes du tissu industriel. Elles jouent un rôle de locomotive par les effets induits directs ou indirects sur l'ensemble du secteur où elles opèrent. On peut citer les entreprises qui valorisent les ressources minières ou naturelles du pays (Minerai de fer, Phosphates, Matériaux de construction, Substances utiles, Alfa...).

II / Recherche et Technologie :

La question que l'on se pose est de savoir s'il y a une place pour la Recherche et la Technologie dans les Entreprises Economiques et particulièrement dans les Entreprises Industrielles.

En considérant que quatre (4) étapes au moins sont nécessaires pour

passer de la Recherche en laboratoire à la mise en fabrication industrielle d'un produit, on comprend que c'est essentiellement les entreprises qui maîtrisent leurs propres produits qui font de la Recherche et qui développent la Technologie: Cas des industries des Phosphates et Dérivés, des Matériaux de Construction de la sidérurgie et certaines industries des secteurs de la métallurgie (Fonderies) et à un degré moindre des constructions électro mécaniques.

Mais qu'en- est-il des P M I qui n'intègrent pas entièrement la fabrication de leurs produits, quels types de recherche et de technologie doivent - elles effectuer, maîtriser et développer. Avec quels moyens et à l'aide de quelles structures d'appui .

Les P M I , face à la libéralisation de plus en plus marquée de l'économie , durant le 8 ème plan sont appelées à une plus grande vigilance vis à vis de la concurence et que par voie de conséquence elles devront se réorganiser, autrement que par le passé, se doter de nouveaux moyens, appropriés en Matériel et en encadrement technique pour gagner la bataille de la competitivité (Maîtrise de la qualité et des coûts).

S'agissant de P M I dont la taille ne leur permet pas de disposer individuellement d'unités de recherche Développement et ne trouvent pas suffisamment de temps pour poser à froid et avec le recul nécessaire les vrais problèmes qui les freinent dans leur développement, elles devront faire appel, d'avantage que par le passé aux services de leur centre, le CETIME et à travers lui aux différentes structures de Recherche qui sont basées à l'université.

Les domaines d'intervention de ces opérateurs sont multiples et touchent à l'ensemble des fonctions de l'Entreprise : (Organisation, Gestion de la production et de la qualité; Tecnhologies de mise en oeuvre des produits; Connaissance des matériaux; Problèmes de corrosion; Analyse de la valeur; C F A O ; Développement de la mécatronique et autres Techniques de coupe d'usinage sans contact; optique laser de revêtement de surface; Plasma d'arc etc ....).

Ce programme de recherche et de développement dans le domaine des Technologies industrielles de production et de gestion concerne l'ensemble des Entreprises économiques; il fait appel de plus en plus à l'informatique et à l'infographie. Un programme similaire, et qui s'étend à d'autres secteurs tels que l'aéronautique, les matériaux nouveaux structurels de pointe et améliorés, le recyclage etc .... vient d'être décidé par le Conseil de l'Europe en Septembre 1991 pour une durée de 5 ans (voir Journal Officiel des Communautés Européennes N° L 269/30 du 29 - 09 - 91). Les institutions tunisiennes de développement et de Recherche trouveront là un champ privilégié de Coopération internationale, profitable à l'industrie et à l'université tunisiennes.

MINISTERE
DE L'ECONOMIE NATIONALE

TUNIS, LE .....

N° Document 2

LES STRATEGIES A LONG TERME ET LE DEVELOPPEMENT INSTITUTIONNEL DANS LE DOMAINE DE LA TECHNOLOGIE ET LA RECHERCHE SCIENTIFIQUE

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La maîtrise technologique constitue un des enjeux importants que la Tunisie devrait gagner au cours de la prochaine décennie. Ceci a nécessité la définition d'une politique claire dans ce domaine qui joue un rôle important et constitue un élément fondamental dans la nouvelle politique du pays axée sur la libéralisation de l'économie et son ouverture sur le monde extérieur.

La période du VIIè plan 87-91 a été caractérisée par l'organisation du secteur de la recherche en le dotant de structures appropriées. Dans ce cadre, un secrétariat d'Etat à la Recherche Scientifique et à la Technologie (SERST) a été créé dont les missions sont de promouvoir ce secteur, de coordonner, de suivre et d'évaluer les programmes y afférent et de veiller à l'utilisation optimal des ressources humaines et matérielles deployées dans ce domaine.(le détail des attributions du SERST figurant ci-joint en annexe).

Pour promouvoir le secteur de la Recherche et de la maîtrise de la technologie, une stratégie sera mise en place durant la période du VIIIè Plan (92-96) et s'articulera autour des axes suivants :

- La promulgation d'un loi cadre de la Recherche Scientifique et la maîtrise de la technologie qui fixe les orientations de la politique nationale dans ce domaine, détermine les priorités de la recherche et le développement de la technologie et définit les statuts des établissements de Recherche Scientifique et du personnel employé dans ce secteur.

- Le renforcement des moyens financiers et l'élaboration d'un budget national propre à la Recherche Scientifique et à la promotion de la technologie, en plus de l'institution d'encouragements incitant les différents intervenants à développer ce secteur.

- L'évaluation de la recherche et la valorisation de ses résultats tout en assurant sa diffusion sans les divers secteurs et domaines d'application.

- La consolidation de la formation dans les spécialités technologiques modernes.

Dans le but de renforcer davantage la recherche scientifique et de faire évoluer ses programmes de manière à pouvoir maîtriser les technologies avancées et les mettre au service du développement, un Comité Supérieur de la Recherche Scientifique et de la Technologie a été mis en place. Cet organe sera appelé à présenter des suggestions concernant les choix à faire dans ce domaine, et à en fixer les possibilités. Il aura également à se prononcer sur les objectifs de la recherche scientifique et la promotion de la technologie et sera responsable du suivi et de l'évaluation des actions à entreprendre.

Quant au soutien de la créativité, à la maîtrise et à la promotion de la technologie industrielle, le Fonds de Promotion et la Maîtrise de la Technologie Industrielle créé en 1992 sera appelé à encourager les petites et moyennes entreprises à investir dans le domaine de la technologie.

Ce fonds participe au financement des études se rapportant au contrôle technologique, aux investissements technologiques ainsi qu'à celles visant l'acquisition d'équipements de conception ou de contrôle faisant appel à des technologies avancées.

D'un autre côté le rôle des Centres Techniques sera consolidé dans le but d'aider les entreprises à choisir les techniques appropriées et à mieux utiliser les moyens de production disponibles tout en oeuvrant à étendre cette expérience à des secteurs autres que la technologie industrielle.

Sur cette base, l'activité de ces centres serait inscrite dans le cadre des orientations suivantes :

- aider les entreprises industrielles, en collaboration avec l'Institut National de la Normalisation et de la Propriété Industrielle, à maîtriser et à promouvoir la qualité des produits industriels et leur prêter une assistance technique.

- renforcer davantage les exportations et soutenir les entreprises industrielles à orienter une grande partie de leur production industrielle vers les marchés extérieurs et ce en coordination avec le Centre de Promotion des exportations.

- promouvoir la recherche développement et encourager les entreprises industrielles à exploiter les résultats des recherches obtenus soit par l'université soit par les établissements spécialisés.

- prêter l'assistance technique nécessaire aux entreprises et aider à la vulgarisation des technologies avancées.

- participer à l'élaboration des programmes de formation en coordination avec les instances spécialisées, afin de faciliter l'adéquation entre la formation et les besoins des entreprises.

La formation occupe une place de choix dans la stratégie de maîtrise de la Technologie et de Promotion de la Recherche Scientifique.
C'est précisément dans ce cadre que s'insèrent la création de l'Ecole Nationale des Technologies avancées, de l'Institut National Supérieur de la Technologie et des Sciences appliquées et d'une génération d'Instituts Supérieurs d'études technologiques à côté de la création d'espaces scientifiques et technologiques pour abriter ces activités et servir de trait d'union entre l'université et les entreprises.

N° Document 3.

ATTRIBUTIONS DU SECRETARIAT D'ETAT AUPRES DU PREMIER MINISTRE CHARGE DE LA RECHERCHE SCIENTIFIQUE ET DE LA TECHNOLOGIE

Le Secrétariat d'Etat auprès du premier Ministre chargé de la Recherche Scientifique et à la Technologie propose la politique du Gouvernement en matière de recherche scientifique et de développement technologique et assure sa mise en oeuvre en collaboration avec les ministères concernés, en vue d'assurer la cohérence de la politique de recherche et des options de développement.

Dans ce cadre, le Secrétaire d'Etat exerce les attributions suivantes :

1 - Proposer et programmer les options nationales en matière de recherche scientifique et de développement technologique et en assurer la remise à jour.

2 - Coordonner l'ensemble des programmes de recherche et de développement technologique dans tous les domaines conformément aux options et aux priorités nationales.

3 - Proposer la législation, les incitations et les encouragements susceptibles d'aider à la réalisation des options susvisées.

4 - Veiller à la réalisation des programmes nationaux de recherche relevant du Secrétariat d'Etat, et suivre l'exécution des autres programmes financés par l'Etat et en assurer l'évaluation et ce en collaboration avec les Ministères concernés.

5 - Tenir un inventaire des grands équipements et installations scientifiques et technologiques détenus par les établissements publics et les entreprises nationales. Les organismes concernés fournissent à cet effet toute information, tout document et rapport et rapport requis par le secrétariat d'état et ce, en collaboration avec les ministères concernés.

6 - Assurer la sauvegarde des résultats de la recherche et veiller à leur valorisation.

7 - Donner son avis sur les projets de budget des établissements de recherche soumis à la tutelle des autres ministères et proposer, en collaboration avec les Ministères des Finances, du Plan et du Développement Régional et les autres Ministères, chacun en ce qui le concerne, la répartition des crédits alloués par l'Etat aux dits établissements.

8 - Donner son avis sur l'organisation du secteur de la recherche scientifique, les statuts particuliers des divers personnels de recherche et toutes les questions ayant un impact sur leur carrière et sur les systèmes de gestion dans le domaine de la recherche scientifique.

9 - Donner son avis sur les programmes de recherche proposés par les entreprises nationales.

10 - Coordonner les différentes actions et coopération internationale en matière de recherche scientifique et de développement technologique et en assurer le suivi en collaboration avec le Ministère des Affaires Etrangères et les Ministères concernés, chacun en ce qui le concerne.

11 - Instaurer une coopération entre les établissements concernés par la recherche scientifique et le développement technologique en collaboration avec les Ministères concernés et permettre en particulier l'accès aux unités de recherche, aux laboratoires et aux équipements scientifiques importants au plus grand nombre d'usagers.

12 - Veiller à promouvoir la valorisation des résultats de la recherche et leur exploitation dans les différents domaines, encourager l'innovation technologique au sein des entreprises et donner son avis en ce qui concerne les incitations consenties par les Ministères intéressés, au profit des entreprises dans le cadre de l'encouragement de la recherche scientifique et de la maîtrise de la technologie et son développement.

13 - Assurer la diffusion des résultats de la recherche scientifique et développer la culture et l'information scientifiques et la publication.

14 - Etudier d'une manière générale toutes les questions se rapportant à la recherche scientifique et au développement technologique.

ANNEX N

COUNTRY REPORT - UGANDA

Policy and Institutional Framework on Technology Transfer and Development

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Introduction

The salient features of this report include the special emphasis by Uganda's leadership on technology as the major means to rapid economic growth, a discussion of emerging structures and policies that facilitate acquisition, evaluation and assimilation of crucial technologies, observations on the emerging trends in fabrication, copy technology and innovations and the status of the private sector in the adoption of technologies for production of goods and services.

Africa's current major debate is about harnessing the potentials of science and technology for national economic and social development. The relationship between science and technology and production, and the transformation of science into the forces of economic growth remained minor factors of consideration throughout the 1960s due to the prosperity that existed as a result of high commodity prices and inflow of foreign finance. African countries were contented with imports. Acquisition and utilisation of technology for local manufacture of goods and services were peripheral considerations. Many countries are waking up to realise that in an economic environment where export commodities are not only few but also fetch low prices, depending on imported goods is expensive and unsustainable. Further, the contribution that science and technology can make in social and economic development is self demonstrative from examples of the newly industrialised countries and infant technology-based economies with impressive positive economic growth rates such as Hong Kong in Asia and Mauritius in Africa.

Arising from the felt need for application of science and technology in the development of national economies, African countries adopted strategies in the Lagos Plan of Action (1980 - 2000), that would ensure the integration of science and technology in national development processes. Today, more than a decade after the pronouncement of the Plan, doubts still exist about the commitment of Africa's leadership to achieving the objectives of that Plan, and the effectiveness of the policies and structures established for the purpose of achieving science -driven technology-based economic growth.

In Uganda, visions have changed as they have differed over time. The differences have been more in the level of government commitment and the will to adopt and support internal technology-based national development, than in the recognition of science and technology as important elements essential for socio-economic development. At independence in 1962, Uganda had an elaborate set up of R & D institutions and research linkages in key sectors of her economy. In 1970, by Cabinet decision, a National Research Council was created to guide research priorities and coordinate R&D efforts in the country. Twenty years later, the mandate, structure and functions of the Council were expanded to accommodate the increased and urgent need for integrating science and technology into the national development process. Hence, a new organisation, the Uganda National Council for Science and Technology was created to advise government and coordinate the formulation of an explicit national policy on all fields of science and technology; promotion and development of S & T and their integration in national development, and coordination of all scientific and technological activities geared to national needs and sustained economic development. This challenge to the new Council and the various government and non-government institutions in Uganda, and the manner with which it is undertaken, are crucial to the national impact of science and technology.

This brief report touches on the status of the technology policy within the context of the overall national science and technology policy and on the institutional, structural and administrative framework hatched to facilitate technology promotion and development.

Technology Policy

Uganda is committed to creating an independent integrated and self sustaining economy. Thus, the existing technology policy, though still implicit in form, is geared towards achieving this objective. The various sectors have comprehensive statements expressing intentions, principles, methods and resources to be adopted in organising and using the technological potential under their charge for the purpose of achieving the same national objective. In this regard, technology is perceived in the broad sense of being a system of local or imported

knowledge, skills and experiences and their organisation and utilisation to produce essential commodities (= goods and services).

At the sector level, Uganda has both explicit and implicit technology policies. The Uganda National Council for Science and Technology, an apex body government established in 1990 to advise itself on all scientific and technological matters, has developed a national technology policy guideline within the overall science and technology policy framework. This guideline, now in a very advanced stage, will guide, promote and regulate technological activities for national development. It will embody priority considerations in the field of technology and technology innovation to meet national objectives, the means to acquire essential technologies, and the resource requirements.

The intention in Uganda is to have a strong, clear institutional framework that will be able to discharge effectively the responsibility of technology policy management. Thus, while the overall management of the national science and technology policy is a statutory function of the Uganda National Council for Science and Technology, and while the Council is responsible for providing guidance and direction to sectoral organs and institutions in matters concerning science and technology, the implementation of the policy will remain the concern of the sectoral institutions; the concerned Ministries. Implied in this, is the need for effective linkages and information exchange between institutions for technology policy management and implementation.

Institutional Framework

In Uganda, the institutional framework for technology application is built on operationalisation scenarios meant to resonate the technology-based development plan with the overall national development plan. The framework should on one hand, develop towards full capacity for identification, access, acquisition, dissemination and assimilation of appropriate technologies, and on the other hand develop a capacity for technology utilisation and sustainance. The latter element implies evaluation, syndication and commercialisation of acquired technologies.

Whereas, therefore, government institutions are charged with the responsibility of setting up structures and mechanisms for facilitating transfer and installation of the technologies, the private sector in Uganda has emerged to be an effective mechanism of promoting innovative skills and copy technologies. It is as a consequence of this that many small scale and medium scale enterprises are now engaged in fabrication and foundry technology.

There has developed much interest among technology applicators in acquiring technology and fabricating similar or immitation products locally. Service institutions and heavy industries depend on maintenance and production technologies. They need constant provision of spare parts even for old obsolete models of industrial machinery. Some of the spare parts can no longer be obtained through direct procurement. Such institutions have developed elaborate skills in fabrication, metalurgy and instrumentation technology.

The Uganda Manufacturers Association is a strong institution in the management of technology-related information. The Association's role is significantly felt in promotion of industrial technology. Together, with the Uganda National Council for Science and Technology and Ministry responsible for industries and industrial development policy, it should be possible to determine national technology requirements, and effectively advise government on technology acquisition. In this regard, the Uganda Small Scale Industries Association is gradually emerging as a central institution in the promotion and development of technologies appropriate for small scale enterprises.

It is in consideration of acquisition, evaluation and dissemination of assessment and transfer, that the Uganda National Council for Science and Technology set up within its structure the Technology Promotion and Development Programme. The programme has developed an articulate vision on technology evaluation and demonstration activities and the logistics of rationalising foreign technology for local adaptation. The Council established its first rural technology evaluation and demonstration centre early this year. Its initial concerns will be agro-industrial technology and rural energy technology systems.

The Department of Technology in the Ministry of Commerce Industry and

Cooperatives is engaged on activities aimed at strengthening endogenous technology capacity while the Ministry of Agriculture, Animal Industries and Fisheries has increased its effort to ensure the extension and application of agrotechnologies. The Ministries of Natural Resources, Housing, Works and Urban Development, Transport and Communication and Health have institutional arrangements meant to manage sectoral policies and the implementation of activities for the promotion of technologies in the energy, mineral and mining, environment, communication and medical sectors. The management of technology information advice to government on technological information and management of intellectual property rights, are statutory mandates of the Council in consultation with the Ministries of Justice and Commerce, Industry and Cooperative. As for S & T information Management, the Uganda National Council for Science and Technology is the national reference centre.

Administrative Framework

Technology policy is a component of the national development plan. Consequently, the overall administration of the policy is a concern of the Ministry of Finance and Economic Planning in its capacity as the institution responsible for coordinating sectoral activities. The existence and expansion of R&D institutions led to fragmentation and in some cases duplication of their activities. It became necessary to establish a machinery for coordination of and provision of advice on research priorities to R&D institutions and to regulate their activities by focusing them on national needs. These are administrative responsibilities passed on to Uganda National Council for Science and Technology. Through its Specialised Technical Committees, the Council is able to review technical issues, and advise government on all policy matters relevant to specific technological activities in the country, and in particular, the financing of technological activities, technological training programmes, documentation of technological information, essential projects for the promotion of technological development, application of results of scientific and technological activities, and measures to be taken to effect cooperation for technology-based development.

Both the Council and Department of Technology in the Ministry of Commerce, Industry and Cooperatives have instituted Science and Technology Policy Dialogues. The purposes of these fora is to ensure maximum harmony among government institutions towards the promotion and application of science and technology but more so technology since it is this component that appears to have visible impact on development systems and society.

The cross-sectoral dimension of the Uganda National Council for Science and Technology, deliberately created by Government to be so, elavated the Council as an interministerial body, grouping together ministries, institutions and organisations responsible for technology application and the transformation of results of scientific research into desirable technologies.

The general weakness in the present S & T administrative framework is, that technological development efforts are too fragmented and not effectively supervised. Scientific and Technological Development Projects are supervised and controlled by their parent organisations and executed by these organisations independently in isolation of each other.

The Uganda National Council for Science and Technology has a statutory mandate to advise and regulate technological flow. The institution is not, however, able to discharge this function because of strategic reasons including inadequate financial and human resource capacity. Despite these constraints, it has already developed a Strategic Plan which spells out necessary strategies and logistics to be undertaken if Uganda is to take full advantage of the global technology for her immediate development needs.

Conclusion

Although technological considerations have been implicitly considered in national development plans, they have not been spelt out definitively for planed action. The present national science and technology policy framework formulated by the Uganda National Council for Science and Technology provides government with a broad and flexible guideline on

the overall direction to be taken in order to assess, acquire, evaluate and assimilate strategic technologies for national development. Explicit sectoral technology policies interpreted from national plans exist and are used in the implementation of sectoral activities. There still exists a need, however, for strengthening the central coordinating capacity to ensure effective and coordinated technological development effort.

The institutional framework for technological development currently embodies governemnt departments, agencies and parastatal institutions, Universities and institutions of higher learning, the private sector, non-governmental organisations and international development agencies. By far, effective technology acquisition and transfer appears to take place through efforts by the private sector and NGOs. The linkage between technology-generating institutions and technology utilisation sectors is quite weak. The capacity of national institutions to commercialise technological information is very much in infancy.

The technological administrative framework needs strengthening. Whereas, the statutory functions of institutions with stakes in the promotion and development of essential technologies are clear, efforts to promote technological development are frequently misdirected. It is for this reason that a lot of thought must be put into streamlining the management of science and technology with emphasis on enhancing linkages among institutions responsible for the operationalisation of technology.

ANNEX O
Acquisition of Foreign Technologies for African Development
THE EXPERIENCE OF THE AFRICAN REGIONAL CENTRE FOR TECHNOLOGY (ARCT)

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A. INTRODUCTION

The global and lasting development of Africa should be first endogenous and self-sustained. Hence the vital importance of the acquisition, mastering and management of viable technologies, owing to the weak performance of Africa's natural resource production, exploitation and valorization systems. This weakness is mainly due to the inadequate type of package technologies and largely contributes to perpetuating the backwardness of the continent in many sectors like food production health management, energy utilization and conservation, etc.

The technological development of a country or a region cannot, however, be a passive phenomenon, consisting of the mere transfer or diffusion of processes, products or engines. It should rather correspond to a will to acquire a know-how or an appropriate technological facility, freely chosen and intended to meeting clearly defined needs.

The judicious choice of a foreign technology aimed at solving a specific problem, be it economic, social or cultural, according to the highest interests of a nation, thus requires real skills for the identification of needs as well as for the various stages of the acquisition and management of this technology.

In fact, there is a greater need now than ever before to carefully acquire technologies and use them for planned and managed product manufacturing, thus integrating both education, research, technology transfer, industrial property, local enterprises promotion, etc.

In this regard, aware of the necessity to combine their efforts, following the great challenges facing the economic and social development of Africa, as well as the limited nature of available resources, the African Heads of State and, Plenipotentiaries decided, in 1977, to establish the African Regional Centre for Technology (ARCT) operational in 1980. With a current membership of Thirty One (31) countries, the ARCT aims at becoming for these countrie's an effective instrument for the promotion, coordination, integration and management of their technological potentials and for the achievement of their global development objectives.

After highlighting the general features of foreign technology imports to Africa, we will give an outline of ARCT experience in this area.

B. GENERAL FEATURES OF TECHNOLOGY IMPORTS

The general features of foreign technologies imports to African countries are related to their funding and the clauses for their acquisition. These can be summarized as follows :

- African countries are not generally autonomous enough as regards their technology importation, its financing, information supply and utilization, etc to deal on equal basis with suppliers of technology. Their position as "demandor" thus comes with a feeling of inferiority and obliges them to make several concessions ;

- African negociators do not always have the technical and legal skills as well as the experience required in presence of those with whom they are negociating. They are less familiar with the subject of international transactions. Hence, very often, inappropriate technological choices ;

- Technical and human resources required for the management, operation and maintenance of technological tools are often lacking or inadequate. Which significantly affects the performance expected from the imported technologies (e.g. turn-key plants) ;

- Technology acquisition or transfer agreement are thus most often associated with restrictions which are unfavorable to African countries and, of course, favorable to the suppliers. For instance :

  . the obligation to purchase certain intermediate products, capital goods, spare parts, etc from the supplying country ;

  . the limitation of competing importation or the possibility to transfer to other local enterprises the technologies imported ;

  . the guarantees for the profits (repatriation) and fees as well as tax and customs rights and the exchange zones (i.e. industrial free zones) ;

  . the employment of expatriate personnel, including in high responsibility posts ;

C. ARCT'S PROGRAMMES AND ACTIVITIES

Focussing mainly on the rural area, the ARCT plays an active role in the acquisition and exploitation of foreign technologies. For that reason, the Centre has adopted global, multisectoral approach from which originate operational and articulated programmes with the following elements :

- Technological Needs Assessment and Survey ;
- Technological Information and Documentation ;
- Research-Development ;
- Technological Demonstration and Extension ;
- Technological Advisory and Consultancy Services ;
- Training and Human Resources Development ;
- Partnership and Scientific and Technological Cooperation.

The implementation of these programmes which focus on the priority sectors of food, energy and capital goods, also calls for direct collaboration of national institutions of the Centre's Member States.

I. TECHNOLOGICAL NEEDS ASSESSMENT AND SURVEY

The Centre has carried out comprehensive surveys on food production, preservation and processing methods in Africa and organized several international special workshops on the following topics "towards self-sufficiency in food production : reduction of post-harvest losses (1981)", "Roots and Tubers Production, Storage, Processing and Marketing and Inter-Country Cooperation in Food Losses Preservation (1985)" and "Formulation, Evaluation and Management of Food Projects (1991).

Furthermore, technological needs assessment surveys in rural areas have been carried out in several countries (Burundi, Nigeria, Senegal and Zambia) and are about to be carried out in some others (Guinea, Niger, Benin, Somalia, Tanzania).

These various surveys are aimed at defining a realistic strategy in the implementation of operational programmes which could satisfy, in an appropriate manner, specific needs in the various countries.

In addition to this, the Centre has implemented an African Technology Atlas project, which involved the identification of the various types of technologies in the area of food processing. A database of the technologies is being created for wider distribution.

II. INFORMATION - DOCUMENTATION

The ARCT has developed an information system specialized in the collection, processing and diffusion of scientific and technological information, especially in the areas of food, energy and capital goods.

The development of the system's capacity as shown in figure 1, of its databases and its library, thanks to the support of UNDP, UNIDO and IDRC made it possible to upgrade the Computer Hardware and Software Systems with the creation of relevant databases on food and energy technologies being used by national or regional institutions, enterprises as well as other potential users. Both WAN and LAN have been established.

Further more, the operation of a local micro-computer network, the use of new software as well as the cooperation with other information networks (i.e. AGRIS, PADIS, RESADOC, TIES, INTIB, etc, the access to commercial servers such as TELESYSTEM, QUESTEL, ESA/IRS, DIALOG, QUICK-COM, etc. and the installation of a conferencing and electronic mail system (FIDONET, COSY and QUICK-COM), are more adequate means for the acquisition, processing, analysis and diffusion of information on these technologies. (See Table I)

Moreover, the updating of the data banks on Science and Technology Resources in Africa made possible the publication of a new issue of the Directory of Science and Technology Institutions and Experts in Africa, as well as the publication, jointly with UNESCO/ROSTA, of a Directory of Technician Training Institutions in Africa. A Guide to Directories on Science and Technology in Africa was published in May 1993.

The collaboration with AAAS (American Academy for the Advancement of Science) facilitated the extension of the data bank to cover scientific and engineering societies in Sub-Saharan Africa with the contribution of the Pan African Union of Science and Technology (PUST).

Also the Centre publishes periodicals in English and French, among which are :

- The bulletin African Technodevelopment on food and energy technologies ;

- The newsletter Alert intended for decision-makers and frontier-technologies oriented (i.e. biotechnologies, microcomputer science, new materials, freeze-drying, controlled atmosphere, food irradiation, etc) ; and

- The bulletin INFONET for information on technology transfer, published through the cooperation of UNIDO within the context of the TIES and INTIB programmes. The Centre has also participated in the Advanced Technology Alert System (ATAS) Network sponsored by the UNCSTD and collaborated with ECA in the establishment of a similar network in Africa (ATAS AFRICAN).

A complete list of the Centre's principal publications is presented in table II.

Furthermore, the ARCT signed a quadripartite agreement jointly with the World Intellectual Property Organization (WIPO), the African Intellectual Property Organization (AIPO) and the African Regional Industrial Property Organization.

The agreement includes information exchange on patents as well as the promotion of African Technological Invention and Innovation Capacities.

III. RESEARCH-DEVELOPMENT

The development or adaptation of appropriate technologies especially as used in the conservation or valorization of several types of food in Africa (i.e. creals and legumes, roots and tubers, market gardening products, sea products, etc) very often require specific Research-Development activities. These activities aimed at improving technological performance, while respecting the quality requirement for products and their use by native populations, do require that the technologies be adapted to suit local conditions. R&D then becomes necessary especially the socio-economic aspects of imported technologies utilization by rural population.

Several research-development activities have thus been sub-contracted to various national institutions.

In Senegal, for instance, research has been conducted at the Food Technology Institute (ITA) (production of biscuits from local cereals and legumes), the Centre for Studies and Research on Renewable Energy (CEERER) (manufacturing of palm oil extraction equipment), the National School of Engineering (ENSUT) at the University of Cheikh Anta Diop construction and utilization of a biogas digester), etc.

EXTENSION - DEMONSTRATION AND TECHNO-ENTERPRISES INCUBATION

The popularization of food and energy technologies, especially in rural areas, generally requires the implementation of pilot units through which to demonstrate their efficiency and cost effectiveness, for an optimal exploitation of local raw materials.

Among projects implemented is the establishment in several countries, of Pilot Units for the processing of various food products (Table III).

The specific objectives of the Pilot and Demonstration Units are the following :

- to develop a complete small and medium scale unit for the valorization of food products, in conformity with consumption habits in Africa ;

- To use each unit as demonstration and trainig centre for nationals as well as for technicians and food processors in neighbouring countries, so as to accelerate the dissemination of the improved technology in the sub-region ;

Furthermore, in most cases, the energy dimension is to be integrated in food technologies implemented, especially through the use of new and renewable energy to minimize energy costs.

For example in the case of the Pilot and Demonstration Unit for the manufacturing of gari (Food Research Institute, Ghana), one of the peculiarities of the project is the coupling of the processing line with a solar tent for pre-drying and with a biogas digester, which can use cassava peelings as fermentation substrate to produce fuel biogas for the manufacturing of gari (roasting/cooking).

Another new approach of ARCT is Techno-Enterprises Incubation to promote Technological Innovation. It originated from the experience acquired through the ARCT's Technological Information System (ARCTIS) and the Pilot and Demonstration Units (PDUs) of the Centre. Optimizing these PDU could make them the launching ramp of SME/SMI the objective of which is to add local value and commercialise technological R&D results.

The local value added is to be increased through integrating the technology in local manufacturing.

Thus, technological extension, training and all factors hampering the development of small and medium scale enterprises/industries are taken into account by the PDU which also associates both donors (i.e. UNDP), entrepreneurs, and other funding agencies and National Officials in charge of SME/SMI development. Techno-Enterprise Incubation, as illustrated in figure 2 (attached), also allows the reduction of risks for the various partners and could serve as a model of technological innovation.

To be noted also is the organizing of several seminars-workshops, in collaboration with various institutions such as the Economic Development Institute of the World Bank (Choice and Management of Foreign Technologies in Africa), WIPO (Role of Patent Documentation as a Source of Technological Information) and UNIDO (INTIB and AFRICA TIES Networks : Negociations on Transfer of Technology), ECA (Capacities of Acquisition of Foreign Technologies in Africa), FAO (Roots and Tubers Post-Harvest Losses Reduction Techniques), etc.

Other training activities have also been undertaken for other types of food products on the site of the Pilot and Demonstration Units (maize shelling techniques in Zambia, Oil Press in Ghana, Rice Parboiling in Sierra Leone, Production of Gari in Ghana, Palm Oil Extraction in Senegal, etc.).

IV. TECHNOLOGICAL ADVISORY AND CONSULTANCY SERVICES

The main objecive is to advise African States in the choice of sound technologies and in the formulation, planning and implementation of integrated science and technology policies and programmes.

Activities include the determination of priorities and constraints that interfere with the production, packaging, preservation, processing, handling and commercialization of the various types of food.

The studies that were finalized in the past five years deal with science and technology, transfer of technology and technological development policies and strategies (Senegal, Cote d'Ivoire, Rwanda), the setting up of a supervision, promotion and support structure for SME/SMI (Equatorial Guinea), the relevance of Food Irradiation Technology for Africa, the prospects of biotechnology development in African States, the production of a Compendium on the Development and Transfer of Technologies for decision-makers and officers in charge of planning, the conduct and coordination of scientific seminars (Cameroon, Guinea, Rwanda, Senegal, etc.).

TRAINING AND HUMAN RESOURCES DEVELOPMENT

The training activities of the Centre are carried out in the form of seminars/workshops, courses/study tours or personalized traineeship - they cover such sectors as Research-Development, Computerized Documentation, Technological consultancy services, planning, development and implementation of scientific and technological policies.

Activities implemented include main Seminars/Workshops, as mentioned in Table IV.

To be noted also is the organizing of several seminars-workshops, in collaboration with various institutions such as the Economic Development Institute of the World bank (Choice and Management of Foreign Technologies in Africa), WIPO (Role of Patent Documentations as a Source of Technological Information) and UNIDO (INTIB and AFRICAN-TIES Networks : Negotiations on Transfer of Technology, ECA (Capacities of Acquisition of Foreign Technologies in Africa), FAO (Roots and Tubers Post-Harvest Losses Reduction Techniques), etc.

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V. CONCLUSION

With the phenomen of universalization of the economy being intensified and marked by the spectacular progress in technological innovations, the acquisition of foreign technologies must play a fundamental role in the self-sustained and integral development of Africa.

However, to overcome the dependency and risk of marginalisation the continent is experiencing this acquisition must be carried out with the highest interests of African countries taking due account.

It is therefore a global process for ARCT and its member States to consider the transfer of technology and the skills necessary for its acquisition as a priority in its work programmes.

After identifying the real needs, especially within the context of rural areas, the center has endeavoured to promote, at all levels (policy-makers, researchers, enterpreneurs, etc.) not only endogenous technologies generation capacities, but also the development of technological infrastructures as well as human resources capable of acquiring, adapting and managing properly the imported technologies.

In this effort, ARCT is closely collaborating with several national (i.e. focal points in Member States) regional (i.e. ARIPO) or international (i.e. ECA, WIPO, UNIDO) institutions. This is newly initiatives like the organization of the current seminar are always welcomed by the Centre.

ARCT/CRAT

JULY 1993

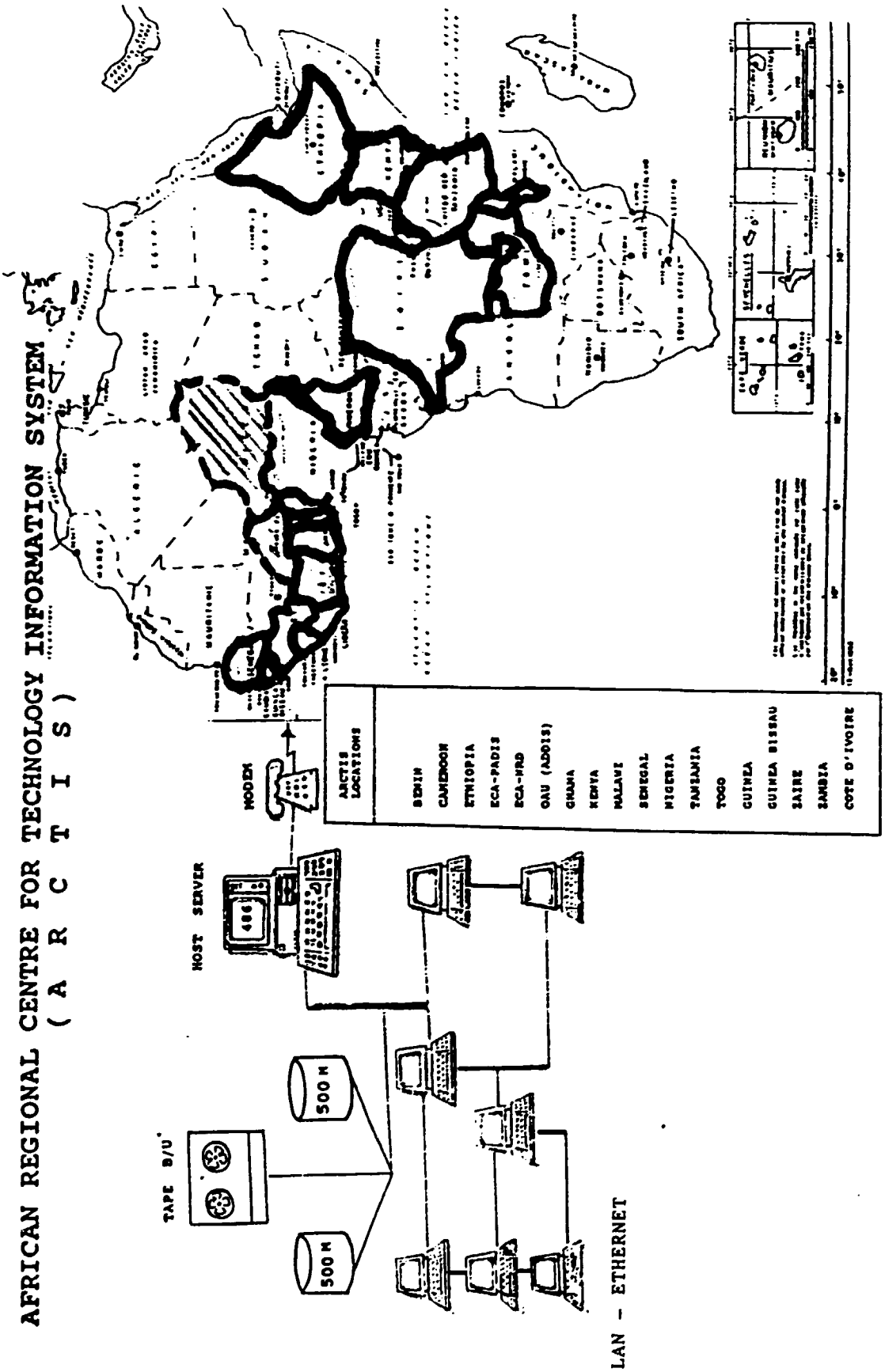
DATABASES/BANKS with which direct access has been established

NAME	LOCATION	SPECIALIZATION	MODE OF ACCESS	SOFTWARE USED	REMARKS
Telesystem QUESTEL	Paris (FRANCE)	.S&T .Industry, Trade and .Commerce	SENPAC Phone Line	KORTEX	Cost of access Paid by clients
ESA/IRS	Rome (ITALY)	.S&T .Industry, Trade and .Commerce	SENPAC Phone Line	•	•
DIALOG	California (USA)	.S&T .Trade and Commerce	SENPAC Phone Line	•	•
QUIK-COM	Vienna (UNITED NATIONS)	Development Information	SENPAC Phone Line	General Electric Quik-Com	•

ELECTRONIC MAIL AND CONFERENCING SYSTEMS

NAME	LOCATION	SPECIALIZATION	MODE OF ACCESS	SOFTWARE USED	REMARKS
FIDONET	Green Net (U.K)	General Messaging	Phone Line	Frontdoor vers. 1.9	
COSY	University of Guelph (CANADA)	.S&T .General Messaging	SENPAC Phone Line	KORTEX	
QUIK-COM	UNIDO, Vienna UN Databases	.S&T .Project Management Industry, .Trade and Commerce	SENPAC Phone Line	KORTEX	

Fig. 1



The boundaries shown on maps do not imply official endorsement or acceptance by the United Nations Industrial Development Organization (UNIDO).

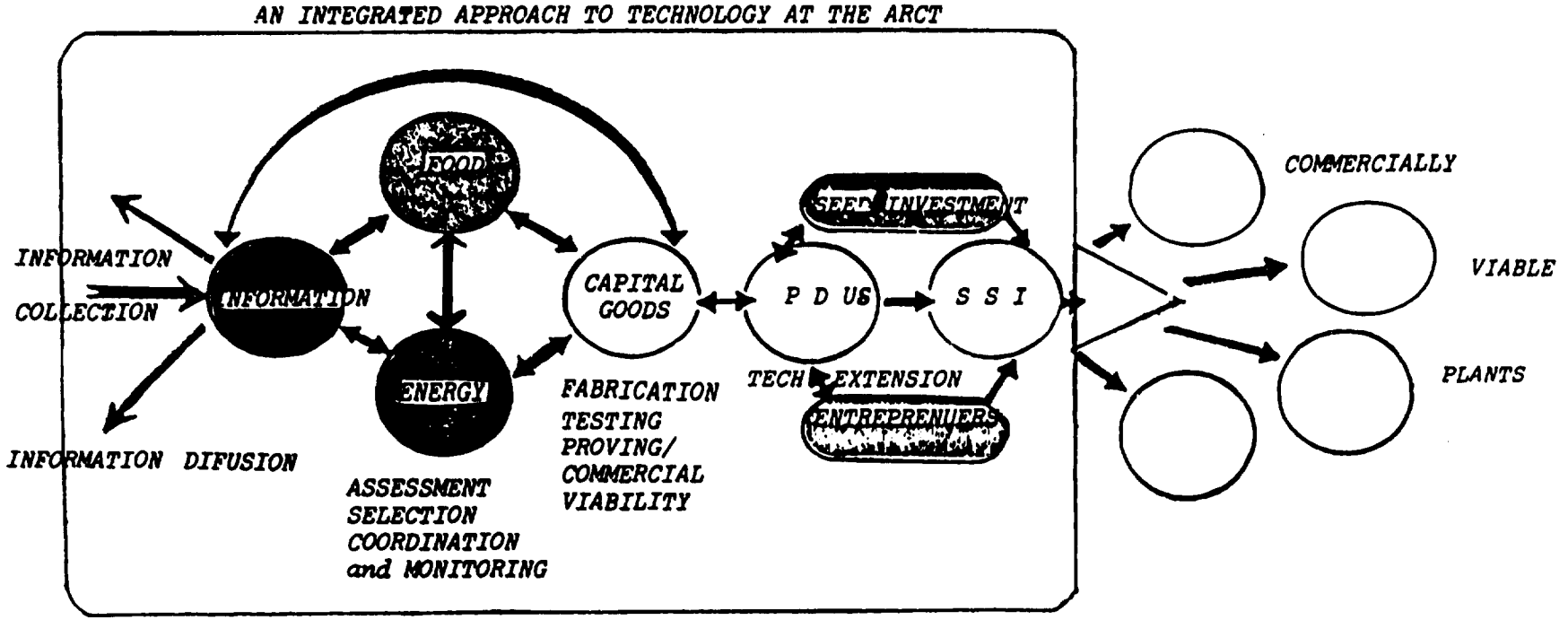

AN INTEGRATED APPROACH TO TECHNOLOGY AT THE ARCT
INFORMATION
COLLECTION
INFORMATION DIFUSION
INFORMATION
FOOD
ENERGY
ASSESSMENT
SELECTION
COORDINATION
and MONITORING
CAPITAL GOODS
FABRICATION
TESTING
PROVING/
COMMERCIAL
VIABILITY
SEED INVESTMENT
P D U S
S S I
TECH EXTENSION
ENTREPRENUERS
COMMERCIALLY
VIABLE
PLANTS

Fig. 2

Table 1B DATABASES AVAILABLE IN ARCT

NAME	C O N T E N T S	SOFTWARE USED	NATURE*	S U P P O R T
ARCTIS	ARCT bibliographic data bases (multidisciplinary).	CDS/ISIS	D. B.	Hard Disk IBM XT Microway
ERG	Bibliographic data bases on energy.	CDS/ISIS	D. B.	Hard Disk G40
IDA	UNIDO bibliographic data bases (Industry)	CDS/ISIS	D. B.	Hard Disk Microway
INSEIP	Directory of Science and Technology Experts and Institutions in Africa.	VISIOTEXTE	W. P.	Diskette 8"
AFRDIR	Directory of Scientific and Engineering Societies in Sub-Saharan Africa.	WORDSTAR	W. P.	Diskette 5"1/4
FORMA	Directory of Technical Institutions Training in Africa.	CDS/ISIS	D. B.	Hard Disk Microway
OFFR	Databases on Technologies Offers.	CDS/ISIS	D. B.	"
REQT	Databases on Technologies Requessts.	CDS/ISIS	D. B.	"
VENT	Databases on Joint-Ventures Opportunities.	CDS/ISIS	D. B.	"
COUNTRY PROFILE	Socio-Economic, Technological Information, etc.	DBASE IV	D. B.	Server

* D. B. : DATABASE

W. P. : WORD PROCESSING

TABLE II : PRINCIPALES PUBLICATIONS DU CRAT - PRINCIPAL PUBLICATIONS OF ARCT

1. Towards Self-sufficiency in Food Production : Reduction of Post-Harvest Losses - Nov. 1981, 118 p.
2. Vers une Production Alimentaire Auto-suffisante : Réduction des Pertes Après Récoltes. Nov. 1981, 128 p.
3. On-farm Handling, Processing and storage of food-grains in Africa. Fev. 1982, 186 p.
4. Pour le Développement de la Valorisation Energétique de la Biomasse en Afrique. Fév. 1982, 231 p.
5. Valorisation Energétique de la Biomasse en Afrique. Mai 1982, 125 p.
6. Rice Parboiler Hardware Development in the African Region. Sept. 1982, 74 p.
7. Roots and Tubers Production, Storage, Processing and Marketing in Africa. Nov. 1982, 231 p.
8. La production, Stockage, le Traitement et la Commercialisation des Racines et Tubercules en Afrique. Nov. 1982, 247 p.
9. Manuel de Vulgarisation Industrielle pour Petite et Moyenne Entreprises des Pays en Développement. 1989. En deux volumes.
10. Biogas Manual : Construction Techniques and Comparison of Four Biodigester Types. 1989, 63 p.
11. Manuel Biogaz : Techniques de Construction et Comparaison de Quatre Types de Biodigesteurs. 1980, 63 p.
12. Directory of Scientific and Engineering Societies in Africa/Répertoire des Sociétés Scientifiques et Techniques d'Afrique (Jointly Published with AAAS and PUST). November 1989, 205 p.
13. Survey of Major Science and Technology Resources in Africa - Inventaire des Principales Ressources Scientifiques en Afrique. 1991, 358 p.
14. Directory of Technician Training Institutions in Africa - Annuaire sur les systèmes Nationaux de Formation des Techniciens Supérieurs du Génie en Afrique. Septembre 1989, 151 p.
15. Guide to Directories on Science and Technology in Africa - Guide des Répertoires en Science et Technologie en Afrique (Under preparation - En cours de préparation).

16. Recueil de Projets sur les Energies Nouvelles et Renouvelables en Afrique - Guide to New and Renewable Energy Projects in Africa. OCT. 1986. 17 p.

17. Technodéveloppement Africain - African Technodevelopment (2 - an/yr).

18. Alerte Afrique (Lettre d'Information sur les Nouvelles Technologies) - Alert Africa (Newsletter on New Technologies) (4 - an/yr)

19. Infonet (TIES and INTIB Biannual Bulletin, free to network members)

20. Summary report of the UNDP sponsored regional workshop on industrial and technological information for small and medium scale industries and enterprises, Rabat, Morocco, 22-25 October 1990.

21. Proceedings of the Regional Seminar on the Impending Energy Transition : Prospects and Role of New and Renewable Energy Systems in Africa, Lome, Togo, 10-14 December 1990.

22. Proceedings of Seminar on Choice and Management of Technology with Special Emphasis on New Technologies, 25-29 June 1990, Mauritius.

23. Proceedings of the Seminar on "Formulation, Apraisal and Management of Agro-Food Projects", Addis Ababa, Ethiopia, April 1991.

24. Guide to Directories on Science and Technology in Africa - Guide des Répertoires en Science et Technologie en Afrique, 1993, 135 p.

TABLE III: TYPES OF PILOT AND DEMONSTRATION UNITS ESTABLISHED BY ARCT FOR THE AGRO-FOOD SECTOR

TYPES OF PILOT UNITS	LOCATION	IMPLEMENTING INSTITUTION
- Processing of Cassava into gari	ACCRA/POKUASE, GHANA	Food Research Institute
- Maize Milling	NAIROBI/KABETE, KENYA	Kenya Polytechnics et University of Nairobi
- Maize Shelling	LUSAKA, ZAMBIA	Technology Development and Advisory Unit, (University of LUSAKA)
- Fish and Sea Products Processing	LAGOS, NIGERIA	Nigerian Institute for Oceanography and Marine Research
- Fish and Sea Products Processing	YAOUNDE, CAMEROON	Centre National d'Etude et d'Expérimentation du Machinisme Agricole
- Palm Oil Extraction	BANJIKAKI, SENEGAL	Centre d'Expansion Rurale

TABLE IV : ACTIVITES DE FORMATION DE GROUPE DU CRAT

SEMINAIRES/ ATELIERS	DATE ET LIEU	NOMBRE DE PARTICIPANTS	PAYS ET INSTITUTIONS REPRESENTES
Harmonisation des Méthodologies pour les Inventaires de Recherche.	06-08 June 1985 (Dakar, Senegal)	16	Senegal, Ethiopia, Kenya, Mali, France, ARCT.
Développement des Capacités d'Acquisition de Technologies Etrangères en Afrique.	07-13 February 1987 (Dakar, Senegal)	25	Cameroon, Comores, Ghana, Guinea-Bissau, Morocco Rwanda, Senegal, Tanzania, Togo, Congo, Mauritius, Uganda, ARIPO, UNECA, NRD.
Perspectives de la Biotechnologie en Afrique.	14-16 November 1989 (Dakar, Senegal)	49	Lybia, Kenya, Egypt, Senegal, Zimbabwe, Nigeria, Cote d'Ivoire, Ghana, Tanzania, Cameroon, Burkina Faso, Morocco Malawi, UNST (USA), FIIRO.
Information Technologique et Industrielle pour Petites Industries et Entreprises.	22-25 October 1990 (Rabat, Morocco)	48	Algeria, Burundi, Cameroon, Egypt, Kenya, Mali, Nigeria, Senegal, Sierra Leone, Tanzania, Morocco Canada, Ethiopia,

ACTIVITES DE FORMATION DE GROUPE DU CRAT (SUITE ET FIN)

SEMINAIRES/ ATELIERS	DATE ET LIEU	NOMBRE DE PARTICIPANTS	PAYS ET INSTITUTIONS REPRESENTES
Choice and Management of S&T with Special Emphasis on New Emerging Technologies and their Application to Development.	25-23 June 1990 (Port Louis Ile Mauritius)	36	Burundi, Senegal, Togo, Ethiopia, Benin, Cameroon, Tanzania, Sierra Leone, Mauritius, ONUDI, CRAT, CEA, ARIPO.
Impending Energy Transition Prospects and Role of New and Renewable Energy System in Africa.	10 - 14 December 1990 (Lome, Togo)	35	Nigeria, Togo, Mali, Senegal, Ethiopia, Tunisia, Saoudi Arabia, Burundi, Benin, Sierra Leone, Botswana, Tanzania, Cote d'Ivoire, Italia, Angola, CRAT.
Construction d'un dôme de digesteur du type chinois.	22 April - 03 May 1991 (Sassal, Senegal)	16	Guinéa, Niger, Malawi, Sudan, Benin, Cape Verde,Guinea Bissau, Burundi, Senegal, ARCT.
Formulation, Appraisal and Management of Food Processing.	27-26 April 1991 (Addis Ababa, Ethiopia)	47	Ethiopia, Senegal, Guinea, Nigeria, Ghana, Togo, Benin, Cameroon, Kenya, Egypt, Thaïland, France, United Kingdom, ARCT, ONNCP, CIRAD/IRAT.

3- Main Abreviations

AAU	:	Association of African Universities
AIPO	:	African Intellectual Property Organization
ANVAR	:	National Agency for the Valorization of Research (France)
ARCT	:	African Regional Centre for Technology
AUPELF	:	Fully or Partially French Speaking Universities Association
CEPGL	:	Economic Community of Great Lakes Countries
ECA	:	Economic Commission for Africa
ECCA	:	Economic Community of Central Africa
ECOWAS	:	Economic Community of West African States
ECWA	:	Economic Community of West Africa
FAO	:	Food and Agriculture Organization
IDRC	:	International Development Research Centre (Canada)
OECD	:	Organisation for Economic Cooperation and Development
UNIDO	:	United Nations Industrial Development Organisation
UREF	:	University of French Speaking Networks
WARDA	:	West African Rice Development Association
WIPO	:	World Intellectual Property Organisation

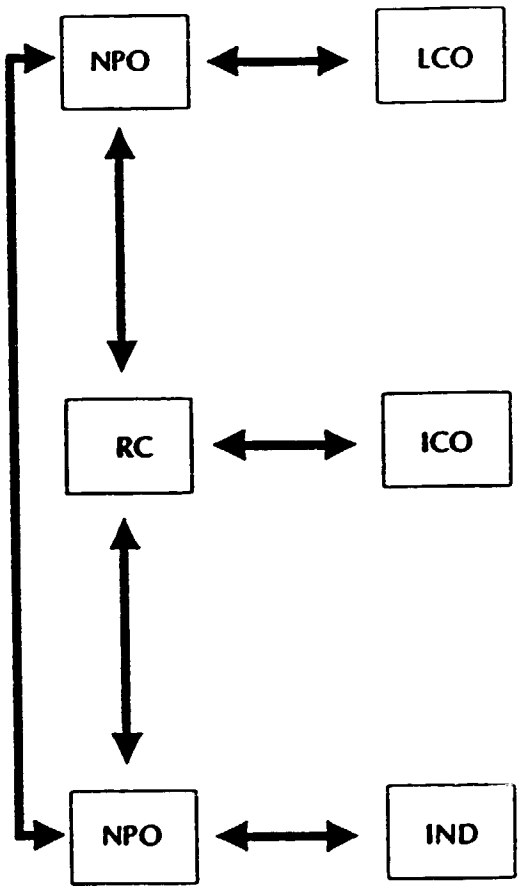
ANNEX P

MECHANICS OF TECHNOLOGY SHARING AND EXCHANGE

Activities

1. Generation of Information
   a) survey and inventory of technologies
   b) continue identifying relevant technologies
   c) networking with local cooperating organizations
2. Processing, Packaging and Dissemination of Information
   a) networking with international cooperating organizations
3. Matching Technology Needs with "Seeds" and Assistance in TechnologyTransfer
   a) information and extension service
   b) negotiation and contracting

Flow Process and Institutions Involved



Legend:

NPO	National Participating Organization
LCO	Local Cooperating Organization(s)
RC	Regional Centre
ICO	International Cooperating Organization(s)
IND	Industries (Enterprises)