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PROGRESS ACHIEVED IN THE DEVELOPMENT  
AND DIFFUSION OF RURAL TECHNOLOGIES

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I. Introduction

Africa is predominantly rural and may remain so at the year 2000 and possibly beyond. Hence, the rural development of the member States of the region is synonymous with their national development. The development of rural life, institutions and economy is the main basis by which Africa can expect to pull itself out of the current socio-economic crisis, with dignity and equity.

In fact, the Lagos Plan of Action (LPA), for the development of Africa, 1980-2000 states, inter alia, "member States should direct their efforts to spelling out a strategy for development, which should guide their thinking, planning and action on bringing about socio-economic changes necessary for improving the quality of life of the majority of the people. This objective requires them to invest in science and technology resources for raising African standard of living and for relieving misery in the rural areas."

The LPA further goes on to add, "attention should, therefore, be paid to the role of science and technology in integrated rural development. This would require, among other things, the generation of financial resources and political will and courage on the part of policy and decision-makers of the continent to induce profound change with far-reaching effects on the use of science and technology as the basis of socio-economic development as a matter of the utmost importance and urgency at this fateful juncture of history."

Studies have revealed that there is a potential for national, subregional and regional co-operation in the field of appropriate technology for rural development in Africa; there is also scope for participation in joint ventures project at subregional and regional levels using current local investments and any available international support in the form of skills, materials and resources to stimulate positively the Impact of Technology on rural development in Africa.

Technology for rural development would mean not merely technology applicable in the rural areas, but technology, which can be accepted, assimilated, operated and replicated by the target group of Rural Development Programmes which would enhance their productive potential without displacing labour.

No technology is resource neutral. In fact, technology, as developed so far has a basis against the assetless and the resourceless. Introduction of capital or resource intensive technology might in a fractured society create further differentiation to the detriment of the assetless. Technology for the poor would, therefore, require to be "de-classed". Is there any such perception with those who deal with the hardware of technology? If so, what action has followed?

Any innovation would be acceptable to the people only when it is understandable, appealing and economical. Technology by its nature is mystifying. Therefore, it becomes difficult to disseminate it to largely illiterate masses, who do not have any prior exposure to scientific and technological knowledge and appliances. Technology for rural development has to be "demystified" so that "users" can grasp it without much difficulty, i.e. the target group should be able to operate efficiently, repair and maintain without external assistance the new appliances of production. How can it be done?

Identification of the technology need has to be a two-way process:

- (a) Demand coming from the ultimate users; and
- (b) Perceived need based on empirical findings of various technical institutions. What should be the mechanism for such identification?

How to ensure that the improved technology is ultimately made available to the poor for their improved economic activity either individually or in groups and not monopolized by others adversely affecting their interest.

What should be the most effective media of transmitting the message of appropriate technology to the poverty groups?

In this spirit, the Science and Technology Section of the Natural Resources Division has undertaken some activities through its science and technology programme, in the development and diffusion of rural technologies.

Some of these activities are undertaken through TCDC programme such as the implementation of an ECA/INDIA project concerning the establishment of a Rural Technology Demonstration Centre in Dakar, Senegal; some demonstration units for rural technologies within the context of the implementation of the third and fourth cycles of UNDP through ARCT/ECA/UNDP Project, RAF/82/039 and RAF/87/068.

The aim of this paper is to present how these activities have been undertaken and also the main progress achieved in the development and diffusion of rural technologies in Africa through ECA during 1988-89.

## II. Activities undertaken and achieved

### 1. ECA/INDIA Rural Technology Development, Demonstration and Replication Centre in Dakar

This project forms a logical continuation of the first one (DIRAFO-K39) also funded by the Indian Government in the promotion of rural technology in Africa. However, having completed all the phases in the first project, this second project aims at establishing a demonstration centre which would undertake the demonstration of viable technologies as well as the replication of the same technologies by using the local raw materials.

The Activity Grant Agreement for the project was signed on 24/2/84 between ECA and the Indian Government. Subsequent to this close consultations have ensued between the ECA and the Indian authorities (the Indian Embassy in Addis Ababa, and the National Research Development Corporation or NRDC - New Delhi) on the elaboration and execution of project activities and between the ECA and the institutions concerned with the hosting of the demonstration centre.

Under the agreement signed between the ECA and the Indian Government, the project has the following four main activities:

- (1) Selection of the technologies for inclusion in the Demonstration Centre bearing in mind the characteristics of the environment of its location;
- (2) Procurement, transportation and installation of the demonstration equipment in the selected site;
- (3) Demonstration of the technologies including the provision of training by consultants;
- (4) Diffusion and replication of the technologies in other areas of Africa.

Status of implementation of activities:

(i) Selection of technologies

The secretariat undertook extensive consultations with the following institutions in the selection of technologies for the Demonstration Unit. The Institut de Technologie Alimentaire (ITA) - the Senegalese institution selected to host the Demonstration Centre; the African Regional Centre for Technology - the regional institution located in Dakar which is collaborating with ITA on this matter; and the National Research Development Corporation of India (NRDC). Technologies were considered under three main groups viz: post-harvest technology, technologies for women, and energy technologies, taking special consideration of the needs of the rural setting in Senegal.

(ii) Procurement, transportation and installation of equipment

The ECA - Natural Resources Division/Science and Technology Section initiated action for procurement during and initiated contacts with NRDC - Delhi and ITA regarding the procedures for the shipping of the equipment and its clearance through the port of Dakar. Concurrently the NRDC sent to ITA its requirements for the preparation of the site where the equipment were to be installed.

With the assistance of a consultant from India, the Secretariat, through the African Regional Centre for Technology at Dakar, finalized the location of the mother centre and counterpart agencies in Senegal for:

- Post-Harvest Technologies and Bottling of coconut water - ITA - Dakar;
- Technologies for women (except Hand Made Paper Project) - National Centre for Training Rural Women Teachers - THIES - Senegal;
- Hand made Paper Project - Centre for Polytechnic for Women - Sukurai, Senegal;

- Experimental Biogas generator - Agropastoral Institute - SASSAL - Senegal;
- Biogas Engines and Water Pumps - CERRER - Dakar, Senegal

(iii) ECA/STS Monitoring and Evaluation Mission to Dakar, 25-30 June 1988

In connection with the follow-up activities for the Rural Technology Development, Demonstration and Replication Centre in Dakar (RTDDRC), ECA has sent Monitoring and Evaluation Mission to Dakar from 25 to 30 June 1988. A mission report with reference NRD/STS/14/88 has been prepared and is herewith attached as Annex I for information.

The main conclusions and recommendations of the report can be summarized as follows:

- Generally the rural population and peasants who can be considered as the first users for appropriate technologies to improve and ameliorate the conditions of life in rural areas, have shown a great interest in the project;
- The Government of Senegal is also committed and is ready to assist the centre in carrying its mandate. In this spirit it has appointed the Ministry of Planning in general and its Department of Scientific and Technological Affairs in particular to act as focal point. It has been decided that a new letter of commitment to ECA and to Indian Government should be sent by the Senegalese authorities.
- Indian authorities in Dakar agreed to seek all possibilities to assist the project through bilateral level.

(iv) ECA High-Level Mission to India, 8-10 August 1988

A high-level mission to India lead by Prof. Adebayo Adedeji, Executive Secretary of the UN-ECA visited India from 8 to 10 August 1988. The objective was to review the status of projects in the field of industry and technology being presently executed by the ECA, and explore possibilities for extension of co-operation in the sectors of agriculture and trade.

The main summarized conclusions and recommendations are in the Report NRD/STS/8/3.1/88 on mission to India, 8-10 August 1988, attached .

It was noted that some of the machines supplied by NRDC were facing problems due to non-availability of required voltage. Infrastructure was not ready in respect of coconut bottling plant and paper-making plant. Due to the time lag in the supply and installation of certain machines, it was suspected that there could be missing parts for some machines.

It was agreed that an NRDC expert would visit Senegal for 15 days to take stock of the deficiencies. In this connection, the following arrangements were agreed to:

I. The expenses for the NRDC expert would be met as follows:

- (i) Travel expenses by Indian Government from out of the allocations for equipment supply;
- (ii) Per diem and other incidental expenses would be met by ECA from budgetary allocations for Dakar project. The NRDC expert would be treated as "Expert" and not as "Consultant".

II. ECA would ensure that the local project coordinator along with three engineers to take care of (a) technology for energy (b) for bottling of coconut water and manufacture of hand-made paper and (c) food technology, were available. Their names and designation would be communicated by ECA to NRDC in advance before the expert starts his mission.

III. The NRDC expert would be able to reach Dakar within two to four weeks after receiving the names from ECA.

IV. The broad terms of reference of the NRDC expert would be defined in advance and communicated by NRDC to ECA.

V. ECA would ensure that the infrastructure and other facilities required would be made available by the Senegal Government.

VI. The unspent balances available with ECA as also in rupee component of the project would be made use of, if necessary, by suitable adjustments, to ensure that the Dakar centre was made fully operative.

The question of replication would be taken care of after the centre was fully operational, people are trained and demand for technologies is generated.

Following that mission, the Executive Secretary made special effort in persuading the concerned authorities in Senegal to take administrative steps for making the project operational. A representative of ECA personally contacted the President of Senegal, and the Minister of Planning and obtained support.

Then the Indian authorities were informed of this step and they reacted positively and the visit of the Indian Expert to Dakar being organized.

(v) Achievements so far:

Installation of mini millet mill, a destoner for grains, a mini pulse mill, an oil expeller, a deep freezer, a waste fire-drier, a biogas digester is over equipments are within the Institut de Technologie Alimentaire and the Centre d'Etude et de Recherche sur les Energies Renouvelables (CERER) at Dakar.

These equipment are currently demonstrated and tested by Senegalese, and are open to African visitors in Dakar.

2. Establishment of Demonstration Units  
for rural technologies in other African countries

After a careful study of conditions for the adoption of technologies in the rural areas, ECA and the African Regional Centre for Technology realized that what was often lacking was the demonstration of viable technologies to potential users as well as entrepreneurs and local enterprise who could undertake their subsequent manufacture and commercialization.

In this connection, a number of requests was received from member States for assistance for the establishment of demonstration units on viable technologies that had already been developed and which had a potential for commercialization in the region.

The procedure which has evolved for responding to these requests entails technical and financial assistance for the realization of the demonstration units. The following actions were generally undertaken in conjunction with the national institutions involved:

- (i) Ascertaining that the proposal from member State addresses an identified need at national or wider level and that the solution proposed is as perceived by nationals who are prepared to invest their time and resources towards the continuity of the project.
- (ii) Commitment of national government to the proposal which should be considered as a national activity to which the ECA through ARCT brings technical and in some case financial assistance for the resolution of a national problem by national experts.
- (iii) Detailed review of technical proposal to ensure that they reflect most up-to-date situation. The ECA/ARCT uses this stage to ensure that designs and ideas emerging from other national, regional or international institutions are reflected in the proposal (for example the demonstration of cassava processing unit for rural use of Ghana incorporates improvement on a cassava grater developed in Sierra Leone and subsequently by ARCEDEM).
- (iv) Establishment and operation of the demonstration unit in a typical potential environment of use to test the reaction of users (eg. the gasifier energy unit in Maize project in Kenya will be set up in the rural areas in Kusumu).

After all the technical factors relating to adoption of the technology has been resolved the following steps are initiated:

- training of potential users at the demonstration site;
- training of potential fabricators by the national institution (in some cases these will be village blacksmiths);
- study tours to demonstration site by policy-makers, entrepreneurs, local financing institutions, banks, etc.;
- Where appropriate, preparation of technology profiles for communication to ARCEDEM for the preparation of final design, manufacturing, and mass production details and drawings;
- assistance to local entrepreneurs and enterprise for the development of a bankable dossier based on market survey for the commercialization of the technology, negotiation of contract and purchasing of equipment.

More recently the ECA/ARCT has sought to involve potential users, entrepreneurs, banking institutions and government agencies in the establishment process through the setting up of a Project Management Committee for the demonstration units. This will ensure inputs from all relevant sources and sufficient familiarity with the project at the stage of commercialization and small-scale enterprise development.

The initial assistance for the establishment of these demonstration units was financed by the United Nations Fund for Science and Technology Development (UNFSTD) project in the Centre which ended in December 1983. Subsequent work for the monitoring, evaluation and development of the demonstration units has been financed from the UNDP project, RAF/82/039 and RAF/87/068 in the Centre. Through this contribution the ECA/ARCT has been able to acquire additional experience which has been reflected in the demonstration units that are to be funded wholly from the UNDP project in the African Regional Centre for Technology.

As a result of the successful results attained from the established demonstration units, additional requests were received for assistance:

- (i) the small-scale Gari Processing and Energy Unit for rural use developed by the Food Research Institute (FRI), Ghana; and
- (ii) the small-scale maize milling and energy unit by Kenya Polytechnic and the Industrial Research and Development Unit of the University of Nairobi.

The main objectives or outputs of these units are given as follows:

<u>Topic</u>	<u>Countries Involve</u>	<u>Main Outputs</u>
Small-scale Gari-Processing and Energy Unit for rural use	Ghana - Food Research Institute	Demonstrated utility of a series of improved equipment developed by institution and other national and regional bodies and based on traditional processing techniques. Integrated energy unit for garification process based on by-products of processing.

<u>Topic</u>	<u>Countries Involved</u>	<u>Main Outputs</u>
Small-scale Maize Milling and Energy Unit	Kenya, Kenya Polytechnic and the Industrial Research and Development Unit of Nairobi University	Demonstrated plant based on adapted imported equipment operated by an energy unit deriving its raw materials for the by-products of the processing activities. Energy unit will also act as a dryer unit for the wet season harvest.

The important features of those units are:

- they involve technology development based on several years of laboratory work which had however not been exposed to demonstration to facilitate their adoption;
- the projects have a region-wide appeal as they involve two of the major staple foods in Africa, namely cassava and maize;
- the proposals incorporate the energy source in an integrated package in which the by-products of processing will be used as an energy source in the actual processing operation. Thus a major feature of the maize unit is a maize cob gasifier which will operate the hammer mill and act as a heat source for drying maize during the rainy season. For the gari unit, the cassava peel will be used as part substrate for biogas generation using techniques developed by the Centre.

The ~~energy~~ components of these projects are partly the direct result of the activities of the ARCT which have consistently shown that the absence of a suitable energy source beyond that derived from human and animal sources is a major constraint to rural industrialization in Africa.

When the demonstration units are established training will be given to users and study tours will be conducted for potential local and other entrepreneurs in the subregion. Technology profiles will then be prepared for transmission to ARCEDEM for the development of final designs, manufacturing, and production drawings. A major outcome of the diffusion exercise will therefore be the collection of data for the promotion of equipment manufacture in the region.

The procedure has already been followed by the ARCT in sending to ARCEDEM technology profiles based on evaluation of options, on technologies for rice milling and cassava processing involving the provision of flow diagrams, hardware analysis, process line diagrams and appraisal of alternative technologies.

These last two units are monitored through the regular meetings of the Project Management Committee which are attended by officials of hosts' governments and representatives of ECA and ARCT.