

FAO SPONSORED PROJECT

FOR

A PROPOSED PROGRAMME/PROJECT FOR
AGRICULTURE AND FOOD PROCESSING FOR
THE AFRICAN REGIONAL CENTRE FOR TECHNOLOGY

By

J. MAUD KORDYLAS (MRS)
DIRECTOR
FOOD RESEARCH INSTITUTE

Food Research Institute
P. O. Box M.20
A c c r a

MAY, 1980

OBJECTIVES OF THE AFRICAN REGIONAL CENTRE FOR TECHNOLOGY

As stated in the Constitution of the African Regional Centre for Technology, the objectives of the Centre shall be to :

- a - Contribute to the development and use of technology within its member states;
- b - Stimulate the awareness of technological development in member states;
- c - Strengthen the technological capability of its member states;
- d - Promote the use of such technology as is suitable for the development objectives of its member states;
- e - Assist within its member states in the formulation of technology policies as an integral part of planned scientific, technological and socio-economic development;
- f - Encourage research and training in the methodologies of technology planning;
- g - Improve for the benefit of its member states, the terms and conditions under which technology is imported;
- h - Promote within its member states the diffusion and dissemination of technology and also the collection and encouragement of the use of technological information;
- i - Promote co-operation among countries of the African Region particularly amongst its member states and
- j - Assess the social implication of the development, transfer, and adaptation of technology and provide the understanding of such implication.

CENTRE RESPONSIBILITIES

To promote these objectives the Centre has set up projects under its central responsibilities to :

- 1 - Document, assess and evaluate R & D institutions in the defined fields of technology within the African Region for manpower capabilities, equipment availability, technological competence, etc. with the hope of strengthening these institutions in areas where needed for effective implementation of Programmes drawn up by the Centre.
- 2 - Establish a chain of institutions within the region with needed competence to collaborate and supplement each other's efforts in the development of technology through the support and encouragement of the Centre through training, provision of experts, equipment, support, etc.
- 3 - To draw up broad programmes on development and transfer of technology.
- 4 - Assign various aspects of Centre drawn programmes to identified institutions for implementation.
- 5 - Provide Consultants to institutions when requested for through maintaining contacts with international agencies, regional institutions and experts in the field.
- 6 - Advise member governments on the formulation of policies on technological matters when requested to do so.
- 7 - Provide advise on patenting and patenting rights to member governments when requested to do so.
- 8 - Collect and disseminate all relevant information in the field of technological development, transfer, etc.
- 9 - Be responsible for the holding of seminars, workshops, etc. for the exchange of ideas amongst experts and institutions, etc.

- 10 - Be responsible for the publication of manuals and textbooks and the publication of journals, production of filmstrips and other brochures to stimulate scientists, experts and to introduce technology to the youth and for educational purposes.
- 11 - To recognize individual and/or institutional efforts and achievements in the field of science and technological development, and innovations through awards, etc.
- 12 - To seek financial support from international agencies, member governments, etc. for the running of the Centre and implementation of its objectives.
13. To evaluate the impact of technology on socio-economic changes and development.

The following General Programme Outline based on projects drawn up by the Centre and a specific programme for Agriculture, Food Processing and Preservation Technology are proposed for consideration. Suggested projects are also drawn up from the proposed Agriculture and Food Industry Programme.

GENERAL TECHNOLOGY PROGRAMME

I. Development of Indigenous TechnologyIA. Development and Consolidation of Indigenous Technologies

IA1. Identification and selection of viable indigenous technologies for development

a - Identification and documentation of past and present indigenous technologies in the following fields :

- Mining
- Metallurgy
- Pottery and Handicraft
- Blacksmithery/Goldsmithery, etc.
- Hunting equipment and weapons
- Herbicides and medical practices
- Spinning and weaving
- Parapsychology
- Water pumping and lifting devices
- Wood work, carpentry and carving
- Road construction (feeder roads)
- Transport (vehicles for transport)
- Telecommunication
- Irrigation technology
- Local building material and technology
- Building techniques and technology
- Agriculture implements and technology
- Leather technology
- Dying and dye making technology
- Cosmetic making
- Food harvesting techniques and technology
- Post harvest technology
- Food storage techniques and technology
- Food processing and preservation techniques and technology
- Paper technology
- Food packaging

- Fishing technology (fishing gear, boats, canoes, etc.)
 - Animal breeding techniques and technology
 - Music, Art, Games and Entertainment, and any other relevant past and present indigenous technologies.
- b - Selection of viable technologies from the fields presented for upgrading, immediate improvement, production and dissemination.
 - c - Presentation of selected technologies to established institutions in the African region or elsewhere for evaluation adaptation, upgrading and improvement.
 - d - Preparation of manuals on acceptable designs and fabrication methods for the improved and other similar suitable technologies adopted from elsewhere (India, China, Philippines, Latin America, etc).
 - e - Preparation of textbooks based on the technological principles involved, functions and usage of the technologies to be utilized in schools and colleges in the African region.
 - f - Provision of training facilities for teachers and technicians needed to teach the fabrication, uses and principles involved in the selected innovations.
 - g - Encouraging member nations to incorporate subject matter into formal education curricula.

IA2. Production and Distribution of Selected Technologies

- a - Establishment of a publishing house for publication of textbooks and manuals on the selected upgraded technologies for
 - i - Training of personnel for production
 - ii - Training of teachers and technicians
 - iii - Teaching in schools and colleges
 - iv.- Training extension officers

- b - Establishment of a chain of workshops for the production of workshop tools and necessary gear needed for training and fabrication of the upgraded technologies.
- c - Establishment of a production chain of factories for the production and dissemination of the selected upgraded technologies and simple implements involving local blacksmith and interested entrepreneurs for repair and maintenance and eventual fabrication.
- d - Training of apprentices (mainly present school leavers) by practical attachment to any relevant workshops within the chain.
- e - Encourage research and further innovations and upgrading of the selected technologies.
- f - Introduction of technologies in areas where needed through an extension system.
- g - Evaluate the impact of the technological development on socio-economic changes and development.

IB. Development of New Technologies and others based on Consolidated Indigenous Technologies

IB1. New Indigenous Technology Development

- a - Further selection of tested technologies from A for upgrading, improvement and inclusion of innovations, etc. for production and dissemination.
- b - Presentation of selected technologies to identified institutions for evaluation, upgrading, improvement, etc.
- c - Preparation of manuals on designs and fabrication methods, etc. for dissemination.
- d - Preparation of textbooks based on the technological principles involved in the new technologies for schools and colleges.

- e - Encouraging and supporting training of personnel for teaching in the schools and colleges on the new technologies.

IB2. Production and Distribution of the New Technologies

- a - Upgrading established workshops for the production of needed tools and gear for the construction of the new technologies.
- b - Upgrading established fabrication workshops and factories for the production, distribution and maintenance of the new technologies.
- c - Introduction of new technologies in areas where appropriate through an extension system.
- d - Evaluate the impact of the technological development on socio-economic changes and development.

IB3. Encouragement of further innovations and new technology development based on the above developments and other new trends in technique development.

II. Technology Transfer

IIA. Assessment and Evaluation of Established Transferred Technologies in the African Region

IIA1. Identification and Documentation of established Industries and imported Technologies within the past 10 - 30 years, in the fields listed under IA1a.

IIA2. Assessment and Evaluation

- a - Assessment and evaluation of established industries with respect to :

- i - Types of equipment
 - ii - Present status of equipment
 - iii - Management
 - iv - Forward planning
 - v - Maintenance and repairs i.e. workshop facilities, etc.
 - iv - Production efficiency (costs, etc.)
 - vii - Other problems.
- b - Assessment and evaluation of imported machinery i.g. agricultural machinery, tractors, vehicles, etc. with respect to :
- i - Types
 - ii - Present status of equipment
 - iii - Management
 - iv - Forward planning
 - v - Maintenance and repairs i.e. workshop facilities, etc.
 - vi - Working efficiency (output, inputs, costs, etc.)
 - vii - Other problems.
- c - Assessment and evaluation of imported electrical and electronic equipment (i.e. laboratory equipment, post and telecommunication equipment, T.V., radio, etc.) with respect to :
- i - Types
 - ii - Status
 - iii - Management
 - iv - Forward planning
 - v - Maintenance and repairs i.e. workshop facilities, etc.
 - vi - Working efficiency
 - vii - Other identifiable problems.

IIB. Establishment of Rehabilitation, Common Services and Maintenance Workshops for existing Transferred Technologies

- IIB1. Identification of existing workshops, their assessment and evaluation for manpower capabilities, equipment, etc. The strengthening of these for the establishment of a chain of workshops for upkeep and maintenance of existing technologies and recycling of technological parts and wastes.
- IIB2. Identification of training needs for manning, maintenance and servicing workshops, and support for such training and development of capabilities to cater for shortcomings identified in IIA above and for future needs.
- IIC. Selection, adaptation and transfer of necessary technologies from industrialized countries to the African region on regional collaboration and co-operation.
- IIC1. Establishment of minimum basic requirements that need to be fulfilled based on information obtained from IIA and IIB for effective transfer and assimilation of new technologies.
- IIC2. Assist member governments in setting up technology transfer centres with linkages to the maintenance and common services workshops within the region to provide the necessary backing for transfer, installation, upkeep and maintenance of transferred technologies.
- IIC3. Evaluate the impact of technology transfer on socio-economic changes and development.
- III. See to the writing up of specific programmes projects in the specified and allied fields identified for technology development in accordance to an acceptable Programme Outline.

PROGRAMME FOR THE DEVELOPMENT OF AGRICULTURE, FOOD PROCESSING
AND PRESERVATION TECHNOLOGY FOR THE AFRICAN REGION

Introduction

Agriculture, fishing and hunting are the main occupation of the people in most African countries through which food is produced. These occupations are in the hands of peasants who constitute the bulk of the population of these countries and who use indigenous technologies in the production and processing of about 70% to 95% of the food that is consumed by the people. With the present trends of rapid increases in population growth in the region, these countries are finding it difficult to grow and provide sufficient food for their increasing populations. The potential to increase the arable land in some of these countries is limited, and it is now being felt that, increased food production must be effected through increasing the effectiveness of the cropped areas, by intensifying agricultural inputs, labour and power. Mechanization of the means of food production, food processing and technology in Africa, is therefore, not only desirable but has now become a necessity for survival.

In their efforts to effect increased food production, large sums of foreign exchange have been utilized in most of the African countries for indiscriminate importation of mechanization technologies from the developed countries. Most of these technologies have not proved successful and have not yielded the desired effects in a lot of these countries. The suitability of these large scale mechanization technologies for most of these countries is therefore, being seriously questioned, since their application under most conditions in the African region has been found not only to be difficult but also to create adverse socio-economic problems. The latest jump in oil prices has also added to the constraints in their application.

The development of effective and appropriate technology that can be adopted, handled and effectively utilized by the bulk of the farming and food processing sectors of the population and the

proper transfer and assimilation of suitable technology in these areas from the developed countries is, therefore, highly necessary, if food production is to be increased and the resulting yields effectively handled. It is only through the adoption of such a scheme that the African nations can hope to feed their growing populations, improve the conditions of the majority of their peoples and raise their standard of living.

The following programme for the development of such technologies for Agriculture and Food Processing and for proper transfer of suitable technology from the developed countries is thus proposed:

PROGRAMME FOR AGRICULTURAL AND FOOD PROCESSING TECHNOLOGY

I. Development of Indigenous Technology in Agriculture and Food Processing

IA. Improvement of existing Technologies and Development of Technologies for Indigenous Agriculture and Food Processing.

IA1. Identification, Documentation and Selection of viable indigenous processes, techniques and technologies for improvement and development.

i - General Agriculture

Processes, equipments, implements and techniques for clearing, ploughing, planting, weeding, irrigation, harvesting, application of fertilizer, application of insecticides, digging, digging rootcrops and tubers, etc.

ii - Post-Harvest and Pre-Processing

Processes, equipment, implements, devices and techniques for threshing, drying, carting, transporting, sorting, cleaning, bagging, storing, distribution.

iii - Processing and Preservation

Processes, equipment, devices and techniques for the processing and preservation of the major foodcrops from the food groups: cereals, rootcrops and tubers, grain-legumes, oilseeds, fruits and vegetables, sugar and spices.

a - General Processing Equipment :

Equipment for Heating, Grinding, Crushing, Fermenting, Drying, Steaming, Carting and Transporting, Mixing and Blending, Distribution and Marketing, Cutting, Rolling.

b - Specialized equipment used for processing crops from the food group.

<u>Food Group</u>	<u>Major Crops</u>	<u>Specialized Equipment</u>
Cereal	Maize	Milling, Cleaning, Dehulling
	Sorghum	Threshing, Sifting, Dough making
	Rice	Steamed Dough making, Baking
	Millet	Packaging equipment, packaging materials, Storage facilities, Marketing, Distribution, etc.
Root Crops and Tubers and Starchy Vegetables	Cassava	Peeling, Grating, Pressing,
	Taro (cocoyam)	Open-pan roasting, Pounding
	Yam	Shredding, Packaging
	Sweet Potatoes	Equipment, Storage, etc.
	Plantain	Marketing and Distribution, etc.
Grain Legumes	Cowpea	Dehulling, Decorticating
	Bambara	Storage, Marketing and
	Lima beans	Distribution.
	Chick pea	
	Lentils	
	Pigeon pea	
	Kidney beans	
	Mung beans	
Oil Seeds	Groundnuts	Oil pressing, nut cracking
	Coconuts	Pounding, Grinding, Roasting,
	Palm nuts	Bottling Equipment, Packaging
	Agushie (melon seed)	Material, Storage, Marketing and Distribution.
	Neri	
	Bungu	
	Sheanut	
	Baobab	
	Kapok	
	Winged bean	

<u>Food Group</u>	<u>Major Crops</u>	<u>Specialized Equipment</u>
Fruits	Citrus Bananas Mango Guava Pineapples Pawpaw	Juicing, Pulping, Holding Evaporating, Storage, Picking, Packaging material, Marketing and Distribution.
Vegetables	Avocado Tomatoes Peppers Okroes Garden eggs Green leafy vegetables Onions, Garlic	Holding, Dehydration, Packaging equipment, Packaging material, picking, brinning, Marketing and distribution.
Sugar	Cane	Crushing, centrifugation, crystalization, packaging equipment, packaging materials, storage.
Beverages	Herbs Fruits Cocoa Coffee Tea Cereals	Drying, pulping, filtration, storage, roasting, soaking, sprouting, grinding, fermenta- tion, bottling equipment, packaging material, evaporat- ing, marketing and distribution.
Alcohol	Palm trees Fruits Cereals	Palm tapping, fermentation, distillation, bottling equip- ment, packaging material, storage, distribution, etc. marketing, etc.

<u>Food Group</u>	<u>Major Crops</u>	<u>Specialized Equipment</u>
Spices and Essence	Citrus & other fruits Peppers Ginger Nutmeg Vanilla Mints Herbs and Grasses Cola, Coffee	Extracting, distillation, dehydration, grinding, packaging material, bottling equipment, etc. marketing and distribution.

iv - Fishing and Post-Harvest Fish Technology

a - Processes, techniques and equipment for fishing-boat construction, fishing gear construction, etc.

b - Post-harvest fish technology, processes, techniques and equipment for fish cleaning, cutting, smoking, drying, frying, salting, storage (cold and ordinary), packaging equipment and packaging material, carting, transporting, distribution, marketing, etc.

v - Animal Production, Processing and Preservation

a - Processes, techniques and equipment for production breeding pens/hatcheries, feeding, feed production, watering, husbandry, housing, medical care, etc.

b - Processing and Preservation Technology
Processing, techniques and equipment for slaughtering, dressing, cutting, storage (cold and ordinary), smoking, drying, salting, curing, packaging, packaging material, marketing, distribution.

Selected techniques and technologies for improvement and development to be put through the General Programme System (Outline IA1B-g; IA2a-g; IB1a-e; IB2a-d, IB3).

II. Technology Transfer in Agriculture and Food Processing

IIA. Assessment and Evaluation of Established Transferred Technologies in Agriculture and Food Processing.

IIA1. Identification and Documentation

- i - Identification and documentation of imported technologies and machinery for agriculture within the past 20 years.
- ii - Identification and documentation of established food processing industries and technologies transferred from developed countries within the past 30 years.

IIA2. Assessment and Evaluation

- i - Assessment and evaluation of imported agricultural technologies and machinery in accordance with the General Programme Outline IIA2b.
- ii - Assessment and evaluation of established food processing industries and technologies in accordance with General Programme Outline IIA2a.

IIB. Establishment of rehabilitation, common services and maintenance workshops for existing transferred agricultural and food processing industries, machinery and technologies in accordance with the General Programme outline IIB1 and 2.

IIC. Selection, adaptation and transfer of required agricultural and food processing industries, machinery and technology in accordance with the General Programme outline IIC1 to C3.

IIC1. Transfer and establishment of industries to support agriculture.

- i - Establishment of industry for the production of fertilizer compost and distribution of manure.
- ii - Establishment of industry for the production of insecticides.
- iii - Establishment of industry for the production of seeds and seedlings.

IIC2. Transfer and establishment of industry for the production of items to support the fishing industry: nets, other fishing gear, boats, etc.

IIC3. Transfer and establishment of industry for the production of items to support animal production: vaccines, drugs, incubators, hatcheries, watering cans, etc.

IIC4. Transfer and establishment of industries for the support of the food industries.

- i - Establishment of industry for the production of packaging materials: cans, pouches, films, containers, cartons, bottles, labels, caps, corks, lids, etc.
- ii - Establishment of industry for the production of small implements and simple equipment for small industries and household uses: knives, forks, spoons, openers, homogenizers, heaters, mixers, crackers, graters, sieves, strainers, weights and measures, household utensils, etc. etc.
- iii - Establishment of industry for the production of items to support food preservation: refrigerators, deep-freezers, ice chests, insulators, ice, cold vans, etc. etc.

IIC5. Transfer and establishment of pilot plants and/or industries to cater for newly developed technologies for food processing when appropriate.

- i - Establishment of industry for the processing of local cereals into flour and composite flour and other products.
- ii - Establishment of industry for the processing of local grain legumes into flour and other products.
- iii - Establishment of industry for the processing of local oilseeds into oil and other products.
- iv - Establishment of industry for the processing of local fruits and vegetables and fruit beverages (non alcoholic).
- v - Establishment of industry for the processing of animal feed.
- vi - Establishment of industry for the processing of fish and fish products.
- vii - Establishment of industry for the processing of meat and meat products.
- viii - Establishment of industry for the processing of milk and milk products.
- ix - Establishment of industry for the processing of commercial agricultural crops within the region: cocoa, coffee, tea, rubber, cotton, jute, kenaf, cola, etc. and any other newly developed commercial crops.
- x - Establishment of industry for the production of alcohol.
- xi - Establishment of industry for the production of sugar.
- xii - Establishment of industry for the production of alcoholic drinks and wines, etc.

IIC6. Establishment of institutions of Food Standards for the control of standards for agricultural produce and industrial food products.

IIC7. Establishment of food quality control laboratories to provide necessary quality control services to food industries.

III. Provision of services, amenities and infrastructure to support Agriculture and Food Industrial Development

IIIA. Provision of services and amenities.

IIIA1. Provision of water for irrigation and food processing.

IIIA2. Provision of power (electricity, oil, wood, coal gas, etc.)

IIIA3. Provision of storage facilities (warehousing, coldrooms, etc.)

IIIA4. Provision of transport.

IIIB. Provision of infrastructure.

IIIB1. Provision of roads -trunk roads, feeder roads, etc.

IIIB2. Provision of other means of communication - rail, water, etc.

IIIB3. Provision of markets and necessary infrastructure for distribution and marketing of agricultural produce and industrial food products.

IV. Evaluate the impact of the establishment of these technologies on the socio-economic changes and development of the region.

R E F E R E N C E S

1. The Constitution of the African Regional Centre for Technology (1977). Inter-Governmental Institution established under auspices of UN and OAU.
 2. Proposed projects drawn up by the African Regional Centre for Technology (1980).
 3. Khan, A.U. (1976): Mechanization toward Self-Sufficiency in Food - Proceedings of the World Food Conference of 1976 p.515. Iowa State University, Ames. Iowa, USA.
 4. FAO (1977): Tubers, Cereals, Grain Legumes and their products Production, Consumption, Trade and Legislation in African Countries. Joint/FAO/WHO Food Standards Programme Co-ordinating Committee for Africa - Third Session, Accra, Ghana CX/AFRO 77/7.
 5. FAO (1977): Deficiencies of National Food Law in various African Countries and suggested methods for African Countries to bring their national Food Law into conformity with the Codex Model Food Law - Joint FAC/WHO Food Standards Programme Co-ordinating Committee for Africa - Third Session, Accra CX/AFRO 77/II.
- KORDYLAS, J.M. (1978): Food Processing, Preservation and Nutrition in Africa - paper presented at the Third General Conference and 10th Anniversary of the Association for the Advancement of Agricultural Sciences in Africa (AAASA).
- KORDYLAS, J.M. (1979): Establishment of Appropriate Food Manufacturing Industries as a Component of National Strategy for Survival. Paper presented at the Ghana Academy of Arts and Sciences Twentieth Anniversary Celebrations 1955-1979, Accra.

PROJECT 1

Project Title

Development of Indigenous Technology in Agriculture and Food Processing.

Project Objectives and Justification

- i - To identify, document, evaluate and select from indigenous and from elsewhere processes and technologies in agriculture and food processing for upgrading and development.
- ii - To stimulate interest of scientists and technologists to provide them with the venue for innovation, creation and development of suitable technology for development of these areas.
- iii - To provide sufficient information, material, etc. to encourage the incorporation of courses in development of indigenous technology as part of the formal education curriculum.

Activities and Output

Research surveys, establishment of chain of competent Research and Educational Institutions for the implementation of the project. Training - teachers, research scientists, technicians (women, nutritionists, home economists), draftmen. Establishment of workshops for production of tools - research into designing and fabrication of prototypes. Manuals, textbooks, etc. School competition in technology development.

Areas of InvestigationAgriculture - General Agricultural Processes for Food.

Production processes, equipment and techniques for land clearing, ploughing, planting, weeding, irrigation, harvesting, application of fertilizers, application of insecticides, digging and digging rootcrops, etc.

Post-Harvest and Pre-Processing Technology: threshers, drying equipment, carting, transporting, sorting, cleaning, decorticating, storage facilities, bagging, distribution.

Food Processing and Preservation: Processes, equipment, devices and techniques for processing and preservation of the major food crops - cereals, rootcrops, grain-legumes, oilseeds, fruits and vegetables, sugar and alcohol, fish and meat.

Heaters, graters, crushers, mixers, blenders, boilers, fermenters, dehullers, decorticating equipment, crackers, distilleries, shredders, oil press, smoking ovens, etc.

Traditional Food Packaging Materials: Baskets, leaves, husks, etc.

PROJECT 2

Project Title

Transfer of Developed Technology in Agriculture and Food Processing.

Project Objectives and Justification

- i - To mechanize small scale agriculture and food processing through the introduction of developed technology.
- ii - To improve and increase food production and food processing in order to meet the food demands of the growing populations of member states in Africa.

Activities and Output

Establishment of chain of factories for mass production. Involvement of local blacksmiths, establishment of effective extension system. Research workshops, and seminars, textbooks, manuals. Workshops for maintenance and recycling of parts and technological wastes. Training - extension workers, technicians, apprentices, engineers, etc.

Areas of Investigation

Agriculture - Transfer of selected improved technologies for general agricultural processes, equipment and techniques for small scale farming. Improved technologies for post-harvest and pre-processing technology, storage.

Food Processing - Transfer of selected improved technologies for food processing for small scale food processing and intermediate food manufacturing industries. Improved traditional food packaging.

PROJECT 3

Project Title

Infrastructural support for Agriculture and Food Industrial Development.

Project Objectives and Justification

- i - To provide necessary infrastructure for agricultural development and the development of food industries in the rural areas.
- ii - To improve the general environmental conditions for the rural dweller in order to arrest the movement of people from the rural areas to the towns and cities.

Activities and Output

Research into finding effective local materials, inexpensive means and/or substitutes for infrastructural development of the rural environment.

Application of research findings for case studies and pilot projects for evaluation and adoption.

Seminars, workshops, training, manuals and textbooks.

Areas of Investigation

- Loanscheme for small farm holders and processors.
- Construction of feeder roads (Uniclean concept proposal).
- Provision of water, irrigation system, etc.
- Provision of energy for light and power.
- Provision of communication system, dissemination of information.
- Provision of markets, storage, cold stores, holding units.
- Transport and housing.
- Pricing of agricultural produce.
- Scheme for the recycling of agricultural wastes.
- Seed multiplication and development units.
- Scheme for the distribution of agricultural inputs.
- Scheme for the distribution of bulk purchases.
- Quality control laboratories.
- Food standards institute.

PROJECT 4

Project Title

Impact of Transferred Technology on Socio-Economic Changes and Development.

Project Objectives and Justification

- i - To appraise the impact or the influence of technological transfer on the standard of living of families adopting them.
- ii - To appraise the overall impact of transferred technology on agricultural development and the development of the food industries.
- iii - To evaluate the overall impact of transferred technology on economic growth of member states.

Activities and Output

Training of field staff.

Research surveys before and after technology transfer.

Statistical evaluations, seminars, workshops.

Areas of Investigation

Sociological appraisal of agricultural and food processing needs from the small scale farmer's point of view.

Rural Sector - Agricultural development.

Development of food processing units and food industries.

Towns and Cities - Development of agrobased industries, etc.

Job creation, and arrest of rural movements to towns and cities.

PROJECT 5

Project Title

Assessment and evaluation of established transferred technologies in the African region.

Sectors - Industry, agriculture and instruments.

Project Objectives and Justification

- i - To identify, document and evaluate the performance and status of established transferred technologies within the specified sectors.
- ii - To set up common workshops for rehabilitation, maintenance, repairs and servicing of transferred technologies identified.
- iii - To bring about the establishment of minimum basic requirements to be followed for effective transfer and assimilation of future technologies into the African region.

Activities and Output

Research surveys, identification and assessment of workshops.
 Training, strengthening of workshops for effective implementation.
 Conferences, research activities for designing and fabrication of replaceable spare parts.
 Production of manuals.

Areas of Investigation

Industries - Food and feed manufacturing industries and pilot plants. Fish and meat processing industries - industries for the production of support products, cold storage, refrigerators, packaging material. Household implements and gadgets, etc.
 Producing food processing equipment.

Agriculture - Industries for the production of agricultural inputs, insecticides, fertilizers, veterinary drugs, seeds, etc.

Industries for the production of agricultural machinery.

Agricultural machinery - tractors, combine harvesters, etc.

Storage structures - silos, etc.

Industries for the distribution and marketing of agricultural produce, machinery, etc.

Instruments - Laboratory equipment for food analyses, quality control work, etc.

PROJECT 6

Project Title

Regional network of Technology Transfer Centres.

Project Objectives and Justification

- i - To assist member countries in fulfilling minimum basic requirements for effective transfer and assimilation of imported technologies.
- ii - To help with the installation, maintenance, repairs and servicing of transferred technologies.
- iii - To stimulate activities for eventual production of such transferred technologies in other regions when needed.

Activities and Output

Research surveys, establishment and equipping of centres in specialized areas, training, research and exchange programmes. Collaborative projects for designing and fabrication of prototypes and spare parts.
Production of manuals.

Areas of Investigation

Industry - Industrial machinery for food and feed manufacture.
Industrial machinery for fish and meat processing.
Industrial machinery for milk processing.
Industrial machinery for production of packaging material and packaging machinery.

Pilot Plants - Pilot plants for new processing technology for cereals, grain legumes, oilseeds, rootcrops and tubers, fruits and vegetables, weaning foods (protein mixtures).

Extrusion and texturized protein - milk extraction.
Industries for processing of cash crops - cocoa,
coffee, cotton, kenaf, tea, sugar cane and industrial
materials - chemicals - alcohol, etc.

Agriculture - Industry for the production of agricultural
implements and machinery, post-harvest equipment
and facilities. Industry for the production of
agricultural inputs, fertilizers, insecticides,
veterinary drugs, seeds.

Instruments - Laboratory equipment, etc.

PROJECT 7

Project Title

Establishment of pilot plants/projects for newly developed technologies for agriculture and food processing.

Project Objectives and Justification

- i - To encourage scientists in the search for new techniques and products in agriculture and in the processing of food crops obtained in the region.
- ii - To set up a system for the identification of viable projects for exploitation.
- iii - To set up pilot plants/projects for costing evaluation and assessment of completed projects.
- iv - To interest and encourage entrepreneurs to invest in projects deemed viable for commercialization.

Activities and Output

- Support - General Research in these areas.
- Research - Identification, designing and fabrication of pilot plants.
- Transfer of needed technologies.
- Setting up of pilot plants at appropriate locations.
- Brochure for dissemination of information on viable ventures.
- Acknowledgement of scientific efforts - awards, royalties, etc.

Areas of Investigation

- i - Tapping of palm trees and collection of sap for the production of alcohol and yeast.
- ii - Extraction of liquid milk from vegetable sources (groundnuts and melon seeds/agushie).
- iii - Production of weaning foods from vegetable protein sources (oilseeds and cereals)- the Winged Bean Project; Soy-Ogi project.

- iv - Extrusion and texturization of vegetable proteins
(grain legumes, oilseeds and cereals).
- v - **Production of palm-pulp flour** as a means of preserving
palm fruits and for soup base.
- vi - Production of intermediate products from cereals,
grits, meal, dehydrated fermented dough, composite
flours, etc.

PROJECT PREPARATORY ASSISTANCE

Agriculture and Food Technology

i - Expert panel meetings:

To discuss proposed Agriculture and Food Technology
Projects.

2 Consultants - International Community

1 Agricultural Engineer

1 Mechanical Engineer (Industrialist)

1 Agriculturist

2 Food Technologists (1 - Research, 1 - Industry).

ii - Surveys and Field Missions:

a - To identify and assess regional institutions to be
involved in project implementation.

b - To identify experts and/or consultants to be involved
in regional or sub-regional meetings for reflection on
the project draft.

c - To collect sufficient background information to aid
in project formulation.

Cost covering international and inter-regional
travel + local transport.

iii - Project Draft Formulation - translation, typing, drawings,
etc. (one month).

2 International consultants per diem + travel = \$16,000.00

5 African consultants per diem + travel = 35,000.00

Draft Formulation costs = 5,000.00

Sub-Total = 56,000.00

iv - Regional or sub-regional meetings for reflection on the project draft.

Cost covering travel + one week per diem for 20-30 representatives from country focal points + translators + rent of meeting place, etc.

Cost for 20-30 representatives (1 week) travel + per diem	..	..	..	=	\$60,000.00
Conference costs	..	..	..	=	30,000.00
Sub-Total	..	..	..	=	<u>90,000.00</u>

v - Final Project Document

Cost covering - translations, typing, drawing, printing, etc.	=	\$20,000.00
---	----	----	----	---	-------------

Sub-Total	=	<u>20,000.00</u>
-----------	----	----	----	---	------------------

Total	=	<u>\$166,000.00</u>
-------	----	----	----	---	---------------------

vi - 14% back stopping	=	\$23,240.00
------------------------	----	----	----	---	-------------

vii - 5% miscellaneous	=	\$8,300.00
------------------------	----	----	----	---	------------

Final Total	=	<u><u>\$197,540.00</u></u>
-------------	----	----	----	---	----------------------------

Total Cost (Approximate)	=	<u><u><u>\$200,000.00</u></u></u>
--------------------------	----	----	----	---	-----------------------------------