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POSSIBLE CONTRIBUTION OF
NON-GOVERNMENTAL ORGANIZATIONS TO THE
DEVELOPMENT OF THE FOOD PROCESSING INDUSTRY IN AFRICA*

Based on the work of M. M. Aref, UNIDO consultant

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I. Introduction.

1. There is an unfortunate general agreement that the most insistent and ever-recurring problem that has been facing the people of Africa for decades is food shortage. Food production has simply lagged behind population increase, and in many parts of the continent nature's vagaries repeatedly amplify the deficit causing mass hunger, suffering and loss of life.

2. African Governments have recognized that, "Urgent, far-reaching and imaginative economic policies are required to avert further deterioration in the economic conditions in Africa and to launch the continent on the path of dynamic self-reliant and self-sustained economic development in a favourable external environment. One immediate task of such efforts should be to increase substantially productivity in all sectors, particularly in the central sectors of food and agriculture. Achieving such a task would be extremely difficult without amelioration of the external and internal factors that have aggravated the structural crisis and without simultaneously enhanced supportive measures by the international community^{1/}. (Author's underlining.)

3. It had also been recognized earlier that, "Developing food industries in African countries will improve food supplies and reduce imports. It will contribute to increased self-reliance by reducing food losses, adding value to the raw materials, increasing export earnings, raising employment levels and improving incomes. It will further ensure better market opportunities, stimulate production and rural development, reduce urban migration, improve nutrition standards both

^{1/} United Nations General Assembly. United Nations Programme of Action for African Economic Recovery and Development 1986-1990. A/S - 13/15 - 4 June 1986.

qualitatively and quantitatively, increase opportunities for investment in agriculture and processing industries, and stimulate the development of allied sectors of the economy." ^{2/}

4. The United Nations General Assembly at its Thirteenth Special Session also called upon all concerned intergovernmental and non-governmental organizations, in view of their significant contribution to economic and social development in Africa, to support and contribute to the implementation of the United Nations Programme of Action for African Economic Recovery and Development 1986-1990. ^{1/}
5. Prior to that, UNIDO in collaboration with the Association of African Development Finance Institutions, had organized a Forum on the Involvement of Non-Governmental Organizations (NGOs) in the Implementation of the Programme for the Industrial Development Decade for Africa ^{3/}, which sat in Abidjan, Ivory Coast, 28-30 August, 1985. The Forum discussed inter alia a paper entitled "The Involvement of NGOs in the Development of Food-Processing and Agro-Industries in Africa." ^{4/}
6. UNIDO had in fact perceived the merits of involving NGOs in industrial development of the Third World, and has established since 1975 a special administrative unit to promote such involvement. ^{5/}-. There are at present some eighty international NGOs from both industrialized and developing countries in consultative status with UNIDO ^{6/}, including professional and manufacturers associations, chambers of commerce and industry, universities, international trade unions, industrial co-operative organizations, industrial R+D institutes and industrial enterprises.

^{2/} United Nations, New York, 1982. UNIDO, ID/287. A Programme for the Industrial Development Decade for Africa. Prepared jointly by ECA, CAU, and UNIDO.

^{3/} UNIDO. ID/WG. 444/6, 25 November 1985.

^{4/} Ibid. ID/WG. 444/3, 24 June 1985, prepared by A.C. Mosha.

^{5/} The Lima Declaration and Plan of Action. Report of the 2nd. General Conference of UNIDO. ID/Conf. 3/31, 9 May 1975.

^{6/} UNIDO. ID/321, July 1984. Directory of International Non-Governmental Organizations in Consultative Status with UNIDO.

7. NGOs are very diverse in their character, and their activities encompass relief and welfare work in addition to development efforts. The latter include a manifold range of operations covering health, family planning, women's organizations, co-operatives and small-scale enterprises. In many situations, their commitment to participatory relationships at the community level and their reliance on local personnel give them advantages over governments as agents for social change and technology diffusion.

In a review of the literature on the evaluation of technical co-operation, Muscat ^{7/} brings to light that the bulk of international funds and attention directed to NGOs is allocated to donor national organizations, not to NGOs indigenous to the developing countries. He also points out that some governments see indigenous NGOs as potential political forces that could compete with the existing power structure, while they in fact seem to be a major overlooked option for development assistance to increase its impact on the poor.

8. The present paper deals with possible practical contributions by NGOs to the development of the food processing industry in Africa, and identifies likely venues through which such contributions might be administered.

^{7/} Muscat, R.J. Evaluating Technical Co-operation : A review of the literature. Development Policy Review.ODI ; 4 (1), 78-84, March 1986.

II. Education and Training.

8. Food technology education and training of personnel engaged in all phases of the food production-processing-marketing system is obviously an essential prerequisite for the growth of the food industry in any country. In the case of Africa, with its chronic multifaceted food problem, it would seem also imperative to instill the concept of a "Food System" in the minds of the population at large from an early stage in life.
9. Primary schools in Africa have been proposed as seats for teaching agronomy and animal husbandry ^{8/}, and it would be very useful if such teaching were to be extended to include the rudiments of food preservation and nutrition.
10. It is therefore suggested that a few African Freedom from Hunger Committees each identify one or two primary schools in their respective country. A guide-line for the selection of a school could be the existence of a token of communal joining-of-forces around school activities. This could be the contribution of the community to the erection of buildings, or the presence of a school workshop in which some of the parents volunteer to demonstrate certain skills.
Once a school is identified, permission should be obtained from the proper authorities to proceed with the "Food System" programme which should include production of specific items of interest to the area, and their preservation by simple methods.
11. Required assistance to the African Freedom From Hunger Committees in charge of the primary schools' "Food System" programmes is to be solicited by UNIDC from industrialized country NGOs. Such assistance would include supply of suitable seeds, processing equipment and packaging material, and possibly some technical personnel.

^{8/} Bergmann, Herbert. Primary School Agriculture. German Appropriate Technology Exchange (GATE), GTZ, 1985.

12. In the beginning food production activities at the primary schools would be limited to growing various vegetables that lend themselves easily to simple processing, such as okra, onions, cucumbers and beets. Processing operations would similarly be confined to vinegar-making, pickling and sun-drying.
13. As the projects progress, the school children would be taught to grow certain berries, and some fruit trees would be grown in the school yards. Production of jams and jellies could then be included in the processing activities.
14. Bee-keeping and honey production would also be a main "Food System" activity of the primary schools, and assistance in this case could be sought from industrialized country co-operatives with relevant experience.
15. While the principal target of the primary school "Food System" programme is the school children, it is obvious that the parents would also be exposed to its teachings. Hopefully, some of them would recognize and adopt part of those teachings for home-preservation of foods. With encouragement, such home-preservation activities could be organized into a small co-operative operation, at which stage the involvement of international co-operatives could be sought by UNIDO to help organize and support the newly-born co-operatives.
16. At the highest rung of the ladder of food technology education and training naturally comes the university. Generally speaking, faculties of agriculture have been the most common seats for this type of learning on which the food processing industry depends for its manpower development. The role of faculties of agriculture in Africa in the development of the food processing industries has been described in detail ^{9/}, and has been shown

^{9/} Aref, M. M. The Role of Faculties of Agriculture in the Development of the Food Processing Industries. AFAA Fifth General Conference on "Food Security in Africa", Mbabane, Swaziland, 22-29 April 1984. UNIDO/PC. 93. February 1984

to include education; training; research and development; consultancy and extension services; advisory functions to governments; and general stimulation of food production-processing-marketing activities. Assistance to Faculties of Agriculture in African Universities to acquire departments, sections or programmes of food science and/or technology, or to strengthen existing ones, would therefore mean much to the development of the African food Industry, and the following paragraphs will be dedicated to this particular point.

17. As a first step in obtaining such assistance for African Faculties of Agriculture it is proposed that UNIDC establishes a "Working Group on Food Technology Education in Africa" composed of representatives of relevant bodies such as the Association of African Faculties of Agriculture (AAFA), UNESCO, FAO, and the International Union of Food Science and Technology (IUFoST).
18. The IUFoST was established in 1973 with the following chief aims 10/:
 - a.) International co-operation among working food scientists and technologists;
 - b.) Support of international progress in basic and applied food science;
 - c.) Advancement of technology in the preservation, processing and distribution of foods; and
 - d.) Stimulation of education and training in food science and technology.

For the achievement of its aims, the IUFoST works through committees of which two seem to be relevant to the purpose of the present paper :

- i.) The Committee on Needs of Developing Countries; and
- ii.) The Committee on Education and Training.

10/ Kefford, J.F.- IUFoST : The International Union, a Force for Progress. Food Technology : 23 (6): 19-21, June 1979.

19. The proposed "Working Group" should be able to identify the needs of African Faculties of Agriculture in the subject matter through the AAFA; how to meet those needs technically through the IUFoST; and financially through the U.N. agencies either directly or through donor country NGOs. It is hoped that the Workshop to which this paper will be presented will come up with Terms of Reference for the proposed "Working Group" and suggest some African and international NGOs for collaboration with it.

20. At the intermediary educational stage, it would be very useful to set up in each African country, or at least on a subregional basis, a boarding secondary school of agrofood industries, where the food production-processing-marketing aspect is emphasized in the curriculum. The students would be producing most of the food they eat on a school farm of adequate size. They would also be charged with harvesting, storage, preparation and processing of the produce, from plant and animal sources, to manufactured items that go into their daily fare, or are marketable to members of the teaching staff. When production levels allow, a marketing outlet could be introduced for sales to the general public of the area around the school.

The schools' general curriculum would be designed to equip the graduates with the necessary knowledge and practical experience to become technicians in laboratories that have to do with the food processing industry; food industries extension workers; food plant foremen; or other similar employment.

It is recommended that UNIDC in collaboration with the Association for the Advancement of Agricultural Sciences in Africa (AAASA), the International Federation of Agricultural Producers (IFAP), and the Society for International Development (SID) explore the possibilities of establishing such schools in Africa. A visit to the Zamorano Escuela Agricola Panamericana in Honduras ^{11/} which is run along the lines described above might be very useful in this connexion.

^{11/} Zamorano. Escuela Agricola Panamericana, Tegucigalpa, Honduras. Annual Report, 1985.

This is a private international college established in 1941 with the authorization and support of the Government of Honduras. It is incorporated in the State of Delaware, U.S.A., as a charitable institution and thus enjoys tax advantages both in the U.S.A. and Honduras. In the field of agricultural education, Zamorano is perhaps the only institution in the world that operates as a university-level teaching centre within a large commercial farming operation. Students learn-by-doing from professors and instructors who teach-by-doing under a code of strict discipline and hard work resulting in a large production of food on the institute's 12,000 acres: food which is partially used to maintain the college population of a thousand people while a substantial surplus is sold to help finance the operation of the institution. Value of gross farm production in 1985 amounted to U.S. \$ 1.5 M (representing 1,260 tons of grains and seeds; 237 tons of vegetables; 255 tons of fruit; 191 tons of beef, pork and poultry; 0.582 million liters of milk; and over 0.645 million eggs.). This constituted 36 percent of operating expenses in 1985, while 46 percent came from students fees, 12 percent from endowment income and only 6 percent from gifts and grants.

The proposed visit to the Zamorano College should include African participants who have food and agricultural educational responsibilities in their home countries, and its financing could well be arranged under the UNDP Inter-regional Programme.

21. In addition to formal education and training in food technology, there are other important training activities which could be carried out on an ad hoc basis by existing institutions of the subject matter, either on their own or with help from international NGOs.

22. There is need in most African countries, for example, to upgrade the technical knowledge of existing food industry personnel in actual factory operations. Short courses of two to three weeks duration in such subjects as food plant sanitation, simple quality control, basic food testing methodology, proper storage of raw materials, and grading of finished products are only a few examples of this type of training. It might be possible for UNIDO to obtain assistance from the IUFOST ^{10/}, or one of its member organizations, to identify African food industry needs for such short courses, and help one of the African Universities having a Food Technology unit to organize them on a national, sub-regional or regional basis as appropriate.

23. Another type of training related to the one just mentioned would be technical short courses for owners/managers of small-scale food processing enterprises producing special food preparations such as bakery goods; sausages; jams, jellies and marmalades; relishes, mustard and other condiments with the aim of improving the quality of their production and bringing it up to a satisfactory standard of uniformity, thus promoting their chances of joining up in a co-operative operation.

24. Still another type of training that could go a long way in helping establish food self-reliance for Africa involves demonstrating to rural women the basics of food storage, and simple food preservation techniques such as sun-drying of fruits and vegetables, vinegar making, preparation of salted and pickled products, cottage or pot cheese and fermented milks.

It is well known that in Africa women play a predominant role in the production, processing and marketing of food 11a/, and such demonstrations should be carried out on regular basis possibly at primary schools or similar institutions.

It is ~~proposed~~ that UNIDO in collaboration with the International Council of Women (ICW) explore the possibilities of initiating such a demonstration on an experimental basis as soon as possible with provision for follow-up evaluation.

The most effective way of demonstrating simple food preservation techniques to African village women might be via a mobile unit fully equipped for the demonstration. The proposed "Working Group on Food Technology Education in Africa" (para. 17) could come up with a complete description of equipment to be installed in the mobile unit, and UNIDO could invite automobile manufacturers in , for example, Brazil, France, FRG, Italy, Japan, Sweden, U.S.A. and U.S.S.R. for assembling the required mobile food processing demonstration units which could be either donated by the manufacturers, or financed by industrialized country NGOs, such as Service Clubs or women's organizations.

11a/ UNCTAD. TD/B/C.6/AC.6/3 1982. Trade and Development Board. Committee on Transfer of Technology. Group of Government Experts on the Transfer, Application and Development of Technology in the Food Processing Sector .

III. Research and Development

25. For the majority of African countries it would seem prudent to assume that the primary function of food processing for some time to come will continue to be the prevention of spoilage and the increased conservation of basic foods intended to meet the nutritional needs of as many people as possible at minimum cost ^{12/}.
26. A secondary function of food processing in Africa would be the manufacture of sophisticated, elaborately-packaged foods that achieve high standards of quality and uniformity allowing them to compete on the international markets to bring home foreign exchange needed for various aspects of development.
27. Without much doubt, research related to this secondary function has been carried out for years, or is being attended to, by food processing transnational corporations (TNCs), or their subsidiaries, either at the headquarters of the TNCs or in the host countries. Assistance from international NGOs to this type of research would perhaps be inordinate for the time being.
28. On the other hand, it would rather seem that assistance from TNCs, all of which are NGOs, to the primary function of food processing in Africa would be desirable and useful. Their long experience and cross-disciplinary knowledge of post-harvest technology of most tropical and sub-tropical agro-food raw materials would be invaluable towards that end.
29. It is therefore recommended that UNIDC, in collaboration with the IUFoST, approach some of the large food processing TNCs to solicit financial and technical assistance for the strengthening of 'primary function' food research in Africa. Such aid would most probably be tax-deductible, and would certainly improve the image of TNCs which has been distorted in many parts of the Third World.

^{12/} UNCTAD. The Food Processing Sector in Developing Countries: Some Recent Trends in the Transfer and Development of Technology. TD/B/C.6/66, 1982.

30. The most direct way of achieving fast results in strengthening 'primary function' food research in Africa would be introducing food processing and utilization research to existing African institutions at present involved only in food production research. The main objective would be to transform such institutions into regional food production and utilization laboratories similar to the famed "Regional Laboratories" of the U.S. Department of Agriculture that have been some of the basic supports of the food processing industry in that country.
31. As units of the U.S. Department of Agriculture, these laboratories formed an essential part of the Agricultural Research Service and covered four regional geographical areas of the U.S.A. : the North Central Region; the Southern Region; the Western Region; and the North Eastern Region. Presently transformed into Regional Research Centers, their research programmes involve by and large the production-processing-marketing aspects of the plant and animal products of regional concern including, naturally, agro-food products. The Southern Regional Research Center (SRRC), for example, is charged with devising new and better methods for processing Southern agricultural products and upgrading the quality and safety of consumer items made from these products. Specific products studied include cotton, cottonseed, peanuts, grain sorghum, soybeans, corn, sugar cane, catfish, eggs and meat. Research is carried out in the Center's twelve units which are : 1.) Biochemical Mechanisms; 2.) Cotton Chemical Reactions; 3.) Cotton quality; 4.) Crop Protection ; 5.) Fabric Systems; 6.) Fiber Structure, Physics and Chemistry; 7.) Fiber and Yarn Processing; 8.) Food and Feed Engineering; 9.) Food and Feed quality; 10.) Food and Feed Safety; 11.) Industrial Environmental Health; and 12.) Oilseed Protein Chemistry.^{13/} The Food and Feed Engineering Research Unit, whose functions

^{13/} Government Research Directory. 3rd. Edition. Gale Research Company. Book Tower. Detroit, Mich., U.S.A., 1986.

are of particular interest to this paper, is charged with :

1.) Development of improved methods of handling and processing agricultural products; 2.) Investigating the role of food processing methods in distribution of natural or added trace metals in typically processed food; 3.) Developing processes for extracting oil and removing anti-nutrients from oilseeds; 4.) Isolation, identification, and elimination of ecology-related factors that contribute to off-flavour in pond-cultured freshwater fish; and 5.) Consultations and co-operation with other research units on engineering problems and process scale-ups.

32. A prime candidate for transformation into a Regional Food-Production-Processing-Marketing Center for West Africa would be the International Institute of Tropical Agriculture (IITA) in Ibadan, Oyo State, Nigeria.

The IITA was founded in 1967 by an official decree of the Federal Military Government of Nigeria, and was launched as an autonomous nonprofit corporation through a cooperative arrangement between the Ford Foundation, the Rockefeller Foundation, and the government of Nigeria. It is governed by a 15-member, nonpolitical Board of Trustees, and has a staff of some 100 research professionals, 15 supporting professionals, 50 technicians, 1000 farm and laboratory workers and 50 others ^{14/}.

The objectives of IITA are : 1.) To increase yields and improve the quality of food crops in the humid and subhumid tropics, with emphasis on development of high-yielding and insect- and disease-resistant plants; 2.) To distribute improved plant materials to national research centers where they can be of significant value to breeding or improvement programs; 3.) To develop soil and crop management practices and farming systems for small farmers; 5.) To publish and disseminate research findings to agricultural scientists, policymakers, and extension workers in national programs, and through them to farmers worldwide; 6.) To operate an information centre and library with a

^{14/} International Research Centers Directory, 1986-87, 3rd. Edition. Gale Research Co.-Book Tower, Detroit, Mich., U.S.A.

collection of the world's literature on tropical agriculture in both English and French for the use of scientists and scholars; and 7.) To organize and conduct conferences, forums, and seminars which review new research, consider current problems, and discuss needs for the future.

The IITA has major programs for Cereal Improvement, Grain Legume Improvement, Root and Tuber Improvement, and Farming Systems (the first and largest of its kind at any international center). In all four programs, the Institute follows a multi-disciplinary team approach. Through farm studies and other means, agricultural economists assess the productivity and profitability of new varieties and farming methods under different local conditions; and evaluate new varieties for food value and consumer acceptance. Within the international network of 13 institutes and research centers supported by the Consultative Group on International Agricultural Research (CGIAR), the IITA has responsibility for research on cowpeas, yams, and sweet potato crops. In addition, IITA has regional responsibilities within tropical and subtropical Africa for cassava, maize, rice, and soybeans; studies are also concerned with cocoyams, plantains and cooking bananas.

33. It can be seen that the proposed transformation could be easily achieved by incorporating processing and marketing aspects to the present activities of the Institute. Major research activities to be built up include storage and transportation problems, as well as processing methodology to suit African needs. In addition to technical factors, social and economic considerations which are of paramount importance in the case of food, would be taken into serious consideration. Special attention would be given to the development of a packaging technology commensurate with African requirements.
34. Strengthening of existing African food research institutes or centers, to better fulfil their present functions and to expand their activities would also be required. There are at present some 20 institutions in Africa involved in different aspects

of food research at different levels of sophistication 14/, but detailed information on their difficulties or needs is not available. It would be advisable if UNIDO, in collaboration with the World Association of Industrial and Technological Research Organizations (WAITRO) and other concerned U.N. bodies such as UNDP, UNESCO and FAO, were to carry out a comprehensive survey of selected food research institutions in Africa to identify their immediate requisites for space, equipment, furnishings, appliances, apparatus, machinery or personnel. Based on the findings of the survey, special programmes should be devised to respond to the needs through direct assistance, twinning arrangements, fellowships and other means of support which could be obtained from international NGOs. These may include the World Association for Element Building and Prefabrication (WAEP), the International Union of Architects (UIA), the International Union of Independent Laboratories (UIIL), the Society of Chemical Industry (SCI), the World Packaging Organization (WPO), as well as several laboratory equipment and machinery manufacturers.

IV. Cooperatives

35. Food processing cooperatives, including producers' and consumers' cooperatives involved in food processing, have been in existence in both market- and centrally-planned economy industrialized countries for decades ^{15/}. Their share in total production of processed food commodities, however, differs substantially from country to country, as well as from commodity to commodity.
36. In Denmark, for example, cooperative organizations account for 88 percent of butter production and 80 percent of cheese production. In France, dairy cooperatives provide 52 percent of the butter, 33 percent of the cheese, 50 percent of the dried milk and 33 percent of the yoghurt. Wine cooperatives and cooperative distilleries produce 65 percent of the wine and distilled products; fruit and vegetable cooperatives supply 20 percent of processed fruit and 30 percent of processed vegetables. In Ireland, 100 percent of butter production is provided by cooperatives. In the Netherlands, cooperatives account for total production of processed potatoes, between 86 and 94 percent of various dairy products, but 60 percent of sugar and only 27 percent of slaughtered pigs and 18 percent of slaughtered cattle.
37. In Bulgaria, consumer cooperatives process fruit and vegetables, operate slaughterhouses and meat processing plants, and produce soft drinks, bread and bakery goods. They account for 55 percent of total bread production, 36 percent of bakery goods, nearly all the soft drinks and mineral water and more than half of the confectionery goods. Producer cooperatives also contribute substantially to the production of canned foods, sugar, candies and beer.
- In Czechoslovakia, consumer cooperatives are fully self-sufficient in bread and bakery goods, confectionery, soft drinks and certain canned foods.

^{15/} Juhász, János. Suggestions for measures to Stimulate Cooperation Between the Cooperatives of Developed and More Industrialized Developing Countries and the Food Processing Industry in Developing Countries. UNIDC/PC.144. June 1986.

In the German Democratic Republic, consumer cooperatives produce 30 percent of all bread and 25 percent of total meat products.

In Hungary, producers' cooperatives have a great share in food processing industrial output through their 2,774 food processing plants which include 212 meat processing factories, 57 dairies, 117 canneries, 54 bakeries, and one sugar refinery. In other centrally-planned economy countries in Europe, both consumers' and producers' cooperatives are also quite active in food processing and contribute substantially to the production of bread and bakery goods, processed meat, canned foods, confectionery goods, soft drinks and processed fruit and vegetables.

38. In the developing countries at large, food processing cooperatives are rather limited both in number and scope, and their share in total food processing activities remain low. In some of the more industrialized developing countries, however, food processing cooperatives have made significant progress in recent years. A notable example is India where milk producers' cooperatives, as exemplified by the Kaira District Cooperative Milk Producers Union Ltd.^{16/}, account for some 50 percent of the country's processed milk and dairy products. In addition, cooperative sugar factories contribute over 50 percent of total sugar production in the country, and cooperative oilseeds processing is on the way to being well established. Cooperative fruit and vegetable processing is also carried out in 28 plants in India ^{15/}, and cooperative processing of plantation crops such as coconuts, cashew nuts, cardamom, black pepper, coffee and tea is undertaken by 58 units.
39. In Africa food processing cooperatives have been more or less limited to cash crops such as coffee, and coffee production-processing-marketing cooperatives have been

^{16/} Aref, M. M. Integration in the Food Processing Industry and the Role of Cooperatives in its Promotion Through International Collaboration. UNIDC/PC.69; July 1983.

operating for many years in Tanzania, Uganda and Cameroon ^{17/}, for example. Other food processing cooperatives also exist in Africa such as the Kenya Cooperative Creameries and the Ghana Bakers' Cooperatives Union, but in general it could be concluded that the cooperative movement in the Continent has not fared too well. Food processing cooperatives, like other cooperatives, still have a long way to go before they can have a recognizable impact on Africa's food security or its social and economic development.

40. In a study carried out for the Committee for the Promotion of Aid to Cooperatives (COPAC) and financed by the Government of the Netherlands, some thought-provoking conclusions were drawn out in respect of cooperatives in Africa ^{18/}. In the four study countries, namely Mali, Niger, Senegal and Burkina Fasso where a considerable degree of comparability existed as regards climate, population and per capita income, one overriding conclusion was reached : governments were often tending to stifle cooperatives rather than encourage them, largely because of a misunderstanding of the real nature of a cooperative. In all four countries official pronouncements proclaimed cooperatives to be an essential element in the policy of rural development, the basic organizational unit for the rural areas. But there was an ambivalent attitude towards cooperatives, conceived of as instruments for executing government policies rather than as the peoples' own organizations serving their interests. The functions of the Cooperative Departments (the main governmental units dealing with cooperatives) were not confined to policy formation, legal supervision, auditing and education, but extended to some of the functions normally belonging to the cooperatives themselves such as representation of the cooperatives vis-à-vis banks

^{17/} The Potential for Cooperative Food Processing in Developing Countries: Towards Global Interdependence. Joint Canada/UNID International Conference. Ottawa, Aug. 22-24, 1983. Final Report.

^{18/} Policies and Structures for Cooperative Promotion in Sahelian Africa. COPAC Secretariat. Summary Report, 1985.

and transport companies, provision of economic services, management of promotion funds and external assistance, and even the running of integrated rural development projects. A lot of scope seems to exist for action to foster the proper development of cooperatives in Africa, including food processing cooperatives which are of specific concern to this paper.

41. One main proposal with respect to the mobilization of non-governmental efforts for the development of food processing cooperatives in Africa would be for UNIDO to establish an "International Panel on Food Processing Cooperatives in Africa". This should be a permanent body composed of :

- i.) Representatives of African producers' and consumers' co-operatives; as well as food processing cooperatives;
- ii.) Representatives of other developing country cooperatives involved in food processing (e.g., India);
- iii.) Representatives of industrial countries' food processing co-operatives;
- iv.) Representatives of International Cooperative Organizations, (e.g., ICA, COPAC);
- v.) Representatives of industrialized country national cooperative unions (e.g., CLUSA, CUC, etc.);
- vi.) Representatives of U.N. Agencies involved in cooperative development such as ILO and FAO.

The Panel would be serviced by UNIDO and would have the following Terms of Reference :

- A.) To review the latest information on sources of international assistance to cooperatives in general, and in particular to food processing cooperatives, and make it available to existing African food processing cooperatives, or to African cooperatives wishing to assume food processing activities;
- B.) To assist the UNIDO Secretariat in formulation of practical recommendations designed to promote the development of cooperative food processing in Africa. Such recommendations will include :

- i.) Surveying current cooperative legislation and regulations in Africa, and elaboration of proposals to governments for their betterment or amendment as appropriate;
- ii.) Provision of technical training to personnel involved in cooperative work, whether supervisory (Governmental) or operational, including food processing techniques when applicable;
- iii.) Elaboration of technical assistance programmes, including production of raw materials and marketing of finished products, which non-governmental organizations could render to existing African food processing cooperatives, or producers' and consumers' cooperatives to encourage them to engage in food processing activities;
- iv.) Identification of available possibilities or modes of financial assistance to cooperative food processing in Africa;
- v.) Examination of present constraints to more collaboration between food processing cooperatives in industrialized countries, as well as the more industrialized developing countries, and counterparts in Africa, and proposing ways and means for alleviating those constraints;
- vi.) Assisting UNIDC in launching a campaign to establish a fund for the development of cooperative food processing in Africa.

V. Small-Scale Industry

42. The concept of "smallness" of industry is obviously subject to the particular economic setting in which an industrial enterprise operates, and thus what might be considered as a small enterprise in Japan, for example, could be regarded as very large if found in one of the least developed countries. Wide diversity therefore exists with respect to a definition of a small (or medium) enterprise, and the question is further complicated by the use of varied criteria to identify the size of an enterprise such as employment, capital or output, in different countries. A review of small- and medium-scale industries' definitions world-wide ^{19/} clearly demonstrates this variability.
43. But despite the differing definitions there seems to be unanimous agreement that, under all economic settings, small and medium scale industrial enterprises have certain advantages that warrant special governmental attention for their support. The basic reasons for promoting them have been listed ^{20/} as follows :
- a.) Small industries provide the seed-bed for growth;
 - b.) They stimulate indigenous entrepreneurship;
 - c.) They mobilize capital not otherwise generated in the economy;
 - d.) They save scarce capital and employ less scarce labour;
 - e.) They can be developed on a decentralized basis in rural and semi-urban areas to meet local demands;
 - f.) They provide linkages to agricultural and rural activities;
 - g.) They use simple technology;
 - h.) They use local resources, both human and material, economically and save on transport costs;
 - i.) They create a middle class of self-employment entrepreneurs;
 - j.) They contribute to more equitable distribution of income and wealth.

^{19/} Aref, M. M.- The Present Status of Small- and Medium-Scale Food-Processing Enterprises in Africa. UNIDO/PC.149, Aug. 1986.

^{20/} Nanjundan, S.- Small and Medium Enterprises. Some Basic Development Issues. UNIDO/PC. 137, April 1986.

44. It is also generally agreed that small- and medium-scale enterprises have certain characteristics in common ^{16/} : control and ownership of the enterprise is in the hands of a few people; day-to-day management decisions and long-term planning are undertaken by one or two owners or managers; and their individual share of the market is rather small. Whenever professional expertise is required, it is normally obtained from outside the enterprise.
45. The advantages of small- and medium-scale enterprises and their particular characteristics have prompted many governments to adopt specific policy measures for their promotion. Such measures center around the establishment of special governmental organizations to cater to the diverse needs of those enterprises, and we find that Japan, for example, has set up a Small and Medium Enterprise Agency (SMEA) since 1948 in recognition of the role those industries can play in dispersing growth, creating new jobs and developing export trade. Similarly, the government of the U.S.A. set up a Small Business Administration (SBA) in 1953 for the same purpose. The SBA is an independent Federal Agency headed by an administrator who is directly responsible to the President. Other industrialized countries have also paid special attention to small- and medium-scale enterprises, and have taken measures of varying degrees of effectiveness and intensity for their support and promotion ^{21/}.
46. In the Third World, the programme of small-industry development in India is perhaps the oldest, and the most established of any developing country. Three national organizations were created in the mid- and late-fifties to provide specific support to that sector : a.) The Small Industries Development Organization (SIDO) to provide technical consultancy; b.) The Small Industry Extension Training (SIET) Institute at Hyderabad for training personnel connected with the development of small industries; and c.) The National Small Industries Corporation (NSIC) for undertaking commercial operations in aid of the small enterprises.

^{21/} Vepa, Ram K. Small Industry. The Challenge of the Eighties. VIKS Publishing House PVT Ltd., New Delhi, India, 1983.

SIDO presently has a network of 25 small industries service institutes, 18 branch institutes, 41 extension centres, 4 regional testing centres, one product and process development centre, and several associated institutions. On an average, 400,000 existing and prospective entrepreneurs are provided annually with technical, marketing, economic, managerial or training services.

In addition to those services, there are several State and National institutions which are charged with financial assistance to the small enterprises. Because of the importance of this aspect of assistance a description of these financial institutions in some detail is presented below :

- a.) In almost all Indian States, there is a statutory provision which allows for the granting of loans to the small entrepreneurs within the State. Loans below Rs. 5,000 are often given on personal surety; above this figure, loans are advanced up to 70 per cent of the security offered. The ceiling for such loans in most States is Rs. 1 Lakh (100,000) for individual borrowers, and Rs. 2 Lakh for industrial cooperatives. The amortization period is normally 10 years, and the interest is low, ranging between 2 and 7 per cent.
- b.) State Financial Corporations (SFCs). At present, 18 such corporations are operating in India and are increasingly providing loans to the small industries sector. Normally, the SFCs provide assistance for financing the purchase of fixed assets; but in some States funds are also granted for working capital. Rates are around 11 per cent reduced to 9½ per cent in designated backward areas, and for technical entrepreneurs.
- c.) Small Industry Development Corporations (SIDCs). In almost all States SIDCs have been set up to : i.) undertake distribution of raw materials; ii.) provide marketing assistance; iii.) operate industrial units and develop industrial areas; iv.) supply machinery on a time purchase basis; v.) manage industrial units taken over by Government; and vi.) grant financial assistance.
- d.) National Small Industries Corporation (NSIC). This corporation was established in 1955 to assist the growth of

small industries through commercial schemes. One of the major schemes it has operated has been to supply machinery, both indigenous and imported, on a hire-purchase basis. Applicants have to make an earnest money deposit of 5 to 10 per cent at the time of application and repay the rest over a period of 7 years, charged at an interest rate of 7 per cent.

47. In Africa, most Governments have also realized that small enterprises form an integral part of their economy and contribute substantially to income generation and employment. A central organization has thus been created in several countries to promote the orderly development of small industry and meet its needs.^{19/} In Francophone Africa, such organizations go under different names such as Société nationale d'étude et de promotion industrielle (SCNEPI) in Senegal, which was set up in 1970, or l'Office de promotion de l'entreprises nigérienne (OPEN) in Niger, which was created in 1987. In one country, the People's Republic of the Congo there is even a Ministry for Small and Medium Enterprises. In Anglophone Africa, the generic name for such organizations is the Small Industry Development Organization (SIDO) of which one was established in 1973 in Tanzania, and one in 1981 in Zambia. Other names are also used for organizations having the same function such as the Kenya Industrial Estates Ltd. in Kenya, and the Small Entrepreneurs Promotion Office (SEPO) in Swaziland.
48. In general, however, these African SIDOs do not seem to be empowered to advance credit to small and medium enterprises, and their functions are limited to other activities as illustrated by those of the Zambian SIDC ^{22/} which may :
- a.) formulate, co-ordinate and implement policies and programmes relating to the development and promotion of small industries;
 - b.) carry out research projects, surveys and market research on any aspect connected with small industries;

^{22/} Government of Zambia. Act No. 18 of 1981.

- c.) provide, or assist in providing, training facilities for persons engaged or employed or to be employed in small industries and co-ordinate the activities of other institutions engaged in such training;
- d.) Provide extension, management and consultancy services for small industries;
- e.) promote local and foreign investment in small industries;
- f.) assist in procuring, obtaining or providing supplies, equipment or raw materials for small industries;
- g.) assist in locating and developing industrial estates, common facility centres and ancillary services.

49. It may thus be concluded that perhaps the most important element to stimulate the formation of more small- and medium-scale food processing enterprises in Africa and to rehabilitate and sustain existing ones would be the creation of a special financing instrument for this purpose.
50. No such instrument exists in the world today, but one closely related has been recently established in Latin America to assist the development of small- and medium-scale enterprises at large and not necessarily those involved in food processing. The U.S.A. Government joined other Governments in organizing a new international financing institution called the Inter-American Investment corporation (IIC) ^{23/}. The IIC, a separate, private -sector-oriented affiliate of the Inter-American Development Bank (IDB) formally began operation in 1986 with a planned initial capitalization of U.S.\$ 200 million. It is empowered to make and guarantee loans, to take equity or quasi-equity positions, and to provide technical co-operation and financial-managerial assistance directly or indirectly to small- and medium-scale enterprises in Latin America.
51. A much less grandiose initiative has been recently started to support African private enterprise, but again it seems to be aimed at African entrepreneurs at large and not necessarily those to establish food processing industries.

^{23/} Economic Impact, No. 53- 1986/1, page 4. U.S.A. Information Agency, Washington, D.C., U.S.A.

Named the Africa Project Development Facility (APDF), it is sponsored jointly by the International Finance Corporation (IFC), the United Nations Development Programme (UNDP) and the African Development Bank (ADB) ^{24/}; funding has been provided by the three sponsors and by 12 donor countries.

The I.F.C. will manage the facility, which will consist of two teams of experts based in Nairobi, to cover Eastern and Southern Africa, and in Abidjan, to cover Western and Central Africa. The experts will help African entrepreneurs and companies develop investment projects and will find financing for them. Each office will be headed by a senior I.F.C. officer with a staff of seven professionals

The APDF has been launched with a \$ 15 million budget, and will assist African entrepreneurs in screening project ideas and make technical and consultancy services available to them.

52. It is strongly recommended that UNIDO endeavors to become also a sponsor of the APDF, and have it broaden its mandate to include assistance to small- and medium-scale food-processing enterprises in Africa. Such assistance would include technical advisory services to existing African SIDOs in various aspects of food processing, and should perhaps be extended even to advancing credit to organized segments of the food-processing industry such as bakeries associations, fisheries cooperatives, or other food processing NGOs.

53. It is also recommended that UNIDO mobilizes industrialized country NGOs' assistance to existing African SIDOs in the area of food processing. This assistance could be obtained, for example, from Canadian Executive Services Overseas (CESO), or similar organizations, that recruit former highly experienced personnel, upon their retirement, for technical and managerial advisory services in the Third World at virtually no cost to the recipient country. In addition to day-to-day advice to SIDOs on current problems of food processing, the high-calibre advisors would be in a position to identify for SIDOs specific assistance programmes which would be more likely to attract further aid

^{24/} Anon. I.F.C. Launches Initiative to Spur African Private Enterprise. *Agribusiness Worldwide*, 8 (6) : 46, July-August, 1986.

from their parent organizations. They would also be able to recognize areas where small- or medium-scale food processing enterprises in their home countries might be attracted to collaborate with counterparts in Africa through sub-contracting, joint ventures, marketing agreements or other modes of going into partnerships.

VI. Food Processing Integration

54. Since its creation in 1967, UNIDO has been stressing the application of the integrated approach to the food processing industry in the Third World ^{25/}. The reason for this stress is the failure which meets attempts to establish that industry in many developing countries due to shortcomings in planning and execution. All too often, no attention is given to the supply of raw materials with the result that expensive imported machinery remain half-idle. Or, a plethora of products is manufactured for a market that neither want it nor can afford to buy it.
55. Vertical integration of food production-processing-marketing can usually be achieved through food producers' cooperatives that process their produce for an identified market. When present in an African country, these cooperatives may be used as examples to be followed by entrepreneurs wishing to enter the food processing field, or as demonstration grounds for governmental personnel involved in food industry development.
56. In countries where no food processing cooperatives exist, however, which seems to be the case for the majority of African countries, there would be need to have a model of the integrated food processing approach; a model to be imitated, with appropriate modifications, by those wishing to go into food processing or to teach those responsible for their guidance.
57. Such a model could well be set up on the campus of any African faculty of agriculture having a food technology department with a suitable food processing pilot plant. According to Tantawy ^{26/}, all 62 faculties of agriculture in Africa have experimental farms, and 4% of them have food science or technology departments. It should be possible

^{25/} Aref, M. M. The Role of Agro-Industries in the Industrialization of Developing Countries. UNIDO/IOD.1, March, 1976.

^{26/} Tantawy, A. O. General Secretary, Association of Faculties of Agriculture in Africa (AFAA) Private communication, December, 1986.

to determine the quantities of a few processed food products which could be consumed or bought by a faculty's population, decide whether such quantities could be prepared by available equipment and personnel at the faculty's food technology pilot plant, and ascertain that the faculty's farm could produce the required raw materials.

58. It is thus recommended that UNIDO, in collaboration with the AFAA identifies a few African faculties of agriculture where the establishment of such an integrated food production-processing-marketing model would be acceptable and possible, and find out what outside inputs are needed for the proper functioning of the model. Assistance might then be solicited from private companies either directly or through appropriate industrialized country NGOs such as national food science and technology institutes (members of IUFOST), service clubs such as Rotary International, Lions International and Kiwanis International, Universities, commercial banks and food processing TNCs.
59. It should be noted here that two other recommendations presented in this paper would also be useful in demonstrating the merits of the integrated approach in food processing : introducing elements of agronomy, animal husbandry and food preservation/nutrition to African primary schools (paras. 9-15); and the establishment of boarding secondary schools of agro-food industries (para. 20).

VII. Food Processing Information

60. Although some 47 African Faculties of Agriculture do have departments of food science or technology ^{26/}, and although at least 20 research institutions in the Continent are involved in food research ^{14/}, there are only 10 subscribers to the Food Science and Technology Abstracts in the developing countries of Africa. The 10 subscribers are located in only 5 African developing countries, indicating even a narrower utilization of this essential service to food research and development.

61. The Food Science and Technology Abstracts (FSTA) is a journal issued by the International Food Information Service (IFIS) which was created in 1968 to provide Primary and Secondary Services related to the retrieval of information from the international literature of food science and technology. The IFIS' main sponsors today are The Commonwealth Agricultural Bureaux in England, the Gesellschaft für Information und Dokumentation in the Federal Republic of Germany, the Institute of Food Technologists in the U.S.A., and the Centrum voor Landbouwpublikaties en Landbouwdocumentatie in the Netherlands.

62. The Primary Services of IFIS are comprised of three main journals : Food Science and Technology Abstracts (FSTA), which is a monthly journal containing about 1650 abstracts per issue, taken from annual coverage of 1800 journals, plus patents, books and reviews, in over 40 languages; Packaging Science and Technology Abstracts (PSTA), which is a bi-monthly abstract journal with worldwide coverage of literature on all aspects of packaging, including food; and Viticulture and Enology Abstracts (VITIS-VEA), which is a quarterly journal covering over 400 journals and other literature on all aspects of grape and grapevine science and technology. All the information contained in the hard copy of any of the three journals is also available on IBM magnetic tape, and the databases are also available for online retrieval via major hosts.

63. The Secondary Services of IFIS constitute : Food Annotated Bibliographies which contain abstracts selected from FSTA, on more than 50 specialized aspects of food science and technology, including Acidulants in Foods, Colorants, Anti-oxidants, Coffee, Stabilizers and Emulsifiers in Foods, Synthetic Dairy Products, etc..; Current Awareness Service, which is a regular updating of specifically requested information; and Retrospective Searches on specific topics.
64. It is recommended that IFIS be invited to apply for consultative status with UNIDO as a non-governmental organization. UNIDO should then, in collaboration with IFIS, explore the possibilities of adding a new Primary Service to the services presently offered by IFIS, the new service to be concerned with African food science and technology .
65. Exchange of information among countries and regions of Africa would be of value to all concerned ^{27/}. There are differences in food production systems and methods of food conservation and utilization which should be disseminated to spread out their benefits. The cowpea, for example, is grown mainly for seed and sometimes for pods in West Africa, while in East Africa it is grown for both seed and leaves, the leaves contributing protein, vitamin A and vitamin C to the diet ^{28/}. Similarly, Zambian agricultural research institutions have devised a type of storage facility which combats grain losses. Known as the "ferrumbu", this facility is structurally stable, water-tight, fire resistant and impervious to insects, rodents and birds. It can be constructed locally from available, inexpensive materials and has a design which is acceptable to farmers. ^{29/}. Its introduction to other African countries should prove quite useful.

^{27/} Chigbo, Bede N.- Broadening the Food Base in Africa: The Potential of Traditional Food Plants. Food Nutrition (FAC) 12(1):4-17, 1986.

^{28/} Gura, Susanne.- A Note on Traditional Food Plants in East Africa: Their Value for Nutrition and Agriculture. Ibid., p.13-26.

^{29/} Chishya, B.E.- Processing and Preserving Traditional Plant Foods in Zambia. Ibid., p. 45-49.

VIII. Summary and Conclusions

66. The most pressing problem facing Africa today is, beyond dispute, the shortage of food. There is equally little question that food processing industries do conserve food supplies by minimizing losses. In addition, they are known to stimulate agriculture production, contribute to rural development, and help reduce urban migration. Many of these resource-based industries have proven to be pioneer industries in several developing countries, as they were several generations ago in some of today's highly industrialized countries.
67. The depth of Africa's food problem, however, is underscored by the Continent's burgeoning foreign debts that drain Governments' resources which might have been, otherwise, channelled to food production and preservation programmes.
68. Furthermore, the world-wide slump in demand for most of Africa's metals and some of its cash crops, the source of much of the Continent's export earnings, has curtailed Governments' efforts to maintain effective financial support to agro-food industries.
69. At the same time, the current wisdom in most industrialized countries seems to embrace a reduction of foreign aid due to high unemployment and economic hardships at home.
70. It is not then out of keeping or place to think of non-governmental organizations, both in industrialized and developing countries, as the most likely instruments for giving and receiving aid to the African food processing industries at present.
71. Five areas have been distinguished where aid from these organizations is probable : education and training; research and development; cooperative food processing; small scale food processing industries; food processing integration; and information.
72. With respect to education and training, the most important

recommendation made is perhaps the creation of boarding secondary agro-food schools at national or sub-regional basis (para.20). Another important recommendation is the creation of a "Working Group on Food Technology Education in Africa" (para. 17)

73. In regard to research and development the basic recommendation is to transform one of the existing agricultural production research institutes in Africa into a regional food production-processing-marketing research institute.
74. As to cooperatives, it is proposed to establish an "International Panel on Food Processing Cooperatives in Africa", and the composition and terms of reference of the proposed panel are suggested.
75. Concerning small scale food processing industries, two recommendations seemed relevant : one concerns a financial instrument for advancing credit to those industries; the other deals with technical assistance to those enterprises through their national SIDOs and development of programmes for aid to them from industrialized country enterprises.
76. On the subject of food processing integration, it is proposed to establish mini-models of a food production-processing-marketing complex on the campuses of some African faculties of agriculture to be used for demonstration and training purposes.
77. As for food processing information, the proposal is to eventually have the International Food Information Service publish African Food Science and Technology Abstracts (AFSTA) which would be of direct relevance to African food research personnel.
78. In conclusion, it is perhaps appropriate to dwell on a few African statistics that clearly highlight the necessity of paying serious attention to the growth of the food processing industry in the Continent.

79. It was estimated in 1980 that 28 percent of Africa's total population of 470 million, i.e. 131.6 million, resided in urban areas. It is projected that some 352 million will live in towns and cities by the year 2000 ^{30/}; an increase of more than 175 percent over the 1980 figure ! Urban populations are of course dependent to a large extent on one kind or another of processed food.

80. In 1980, in the whole of Africa, only Cairo had a population over 4 million. At the end of this century, however, there will be 12 other African cities with over 4 million inhabitants. The populations of three of the largest African cities, Cairo, Kinshasa and Lagos, will by the year 2000 be 13.2, 8.9 and 6.3 million respectively.

It staggers belief to contemplate only the number of bakeries necessary to supply such populations with their daily bread !

^{30/} United Nations, Estimates and Projections of Urban, Rural and City Populations 1950-2025 : The 1980 Assessment, New York, 1982.