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Expert Group Meeting on Design, Development and
Manufacture of Simple Food Processing and
Preserving Equipment*

Lusaka, Zambia, 9-13 January 1989

REPORT **

* Organized by UNIDO in co-operation with the Government of Zambia
and the Village Industry Service

** This document has not been edited.

PREFACE

Article 2(j) of the Constitution of UNIDO, resolution ID/CONF.5/Res.2 adopted by the Fourth General Conference of UNIDO, conclusions and decisions adopted by the Industrial Development Board during its fifteenth to eighteenth sessions, decision IDB.3/Dec.6 adopted by the Industrial Development Board at its third session and General Assembly resolution 39/323 (paragraphs I.6 and I.7) all call for closer technical co-operation in order to facilitate the transfer of technology.

Under certain circumstances, technologies used in developed countries can be applied without modification in developing countries, the problem being essentially one of selection, acquisition and assimilation. In general, however, technologies have to be modified or adapted. In many instances, the interests of the developing countries would best be served by the development or upgrading of indigenous technologies. However, such development is often constrained by the lack of basic skills.

Many developing countries have already made some progress in developing indigenous technologies and achieved significant results, others are still at the initial stage.

Through its mandate, UNIDO would like to promote and accelerate the process of industrialization of developing countries in order to enable them to increase their share of the world industrial production, thereby raising their standards of living.

In its Programme and Budget 1988/1989, UNIDO has planned to convene an expert group meeting on the design, development and manufacture of simple food processing and preserving equipment with an emphasis on the utilization of locally available raw materials and on the improvement of existing technology.

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INTRODUCTION

The purpose of this meeting was to bring together experts from the Eastern and Southern African Subregions to:

- (a) review the existing traditional food processing and preserving equipment;
- (b) collect innovative, indigenous designs of simple (easy to handle) food (cassava, maize, sorghum, yam, coconut, ground-, cashew- and palm-nut, etc.) processing and preserving equipment;
- (c) promote available indigenous designs to potential manufacturers for production and marketing;
- (d) exchange technical know-how in this field in the spirit of intra-African industrial co-operation;
- (e) consider possibilities of manufacturing such equipment using locally available raw materials and human resources.

It is about time that developing countries take their own initiatives to start manufacturing simple tools and equipment using their skilled nationals and indigenous raw materials to help alleviate rural populations and at the same time to contribute to their country's economic recovery. It is characteristic in the engineering field that the interest in applying human intellectual power to satisfy mankind's physical and social needs through the use of information and theories acquired in science and daily life experience is very strong. That fact was really demonstrated during the Expert Group Meeting, where the engineers, designers, food technologists, machine-tool manufacturers and social workers were discussing in a concerted spirit to find ways and means to satisfy the potential end-users of food processing and preserving equipment.

I. PARTICIPATION

The meeting was attended by experts from the following countries: Botswana, Burundi, Ethiopia, Lesotho, Malawi, Sudan, Uganda, United Republic of Tanzania and Zambia. The representatives of the following organizations also participated in this meeting: United Nations Children's Fund (UNICEF), United Nations Development Programme (UNDP), National Council for Scientific Research (NCSR), Technology Development and Advisory Unit (TDAU), Village Industry Service (VIS), Small Industries Development Organization (SIDO), Industrial Development Corporation Limited (INDECO), Kasisi Agricultural Engineering Section, Ministry of Industry and Commerce, Ministry of Agriculture and Cooperatives, Zambia Cooperatives Federation, Lutanda Industries, Livingstone Hardware Stores Limited, Turning and Metal Limited and Northland Engineering Limited. The list of participants is attached as Chapter X.

II. OPENING SESSION

1. Address of the Senior Industrial Development Field Adviser (SIDFA)

In his opening speech, Mr. Schroll, UNIDO Senior Industrial Development Field Adviser, spoke on behalf of the United Nations Development Programme (UNDP) Resident Representative. He stressed the cardinal importance of the use of appropriately designed food processing and preserving equipment to reduce post-harvest losses. Since the food crops of the subregion are different from those of industrialized countries, adaptation and modification of most of the available designs through use of indigenous technologies should be emphasized.

Many countries have already made some progress in developing indigenous technologies. There are institutions in this field working on innovations and technologies, which deserve to be introduced for Africa's benefit.

2. Address of the Honorary Chairman for the Village Industry Service

Mrs. Mapoma, the Honorary Chairman of VIS and Co-organizer of this Expert Group Meeting, has always placed the development of the food processing sector at the cottage and village industry level high on her priority list. She found this meeting to be dream come true because VIS has been looking forward to such a meeting for a long time.

VIS has been making its attempts to identify simple technologies and processes in use at the grass-root level to observe how these can be continuously improved and upgraded. VIS has had to hunt for expertise as well as technologies to satisfy the needs of the people--the majority of whom are women and youths--engaged in food processing and preservation activities.

As a matter of fact, VIS has planned to undertake a big project in food processing and preservation commencing this year. It is for this reason that VIS openly welcomes the opportunity that this meeting has presented to the participants. VIS can hopefully learn from the exchange of expertise and experience of the participants and that the information gathered during this meeting can benefit the target groups. Indeed, it is also a wish that the opportunity given by UNIDO to share experiences with other countries in the subregion of Africa will contribute to the strengthening of regional co-operation in the transfer of technological information and in R+D. Certain problems related to establishing food processing and preservation units must be addressed, such as:

- (a) The lack of local equipment/machinery suitable for use in small, rural plants for food processing;
- (b) Poor liaison between research institutions and manufacturing enterprises in developing and producing local equipment/machinery, such as maize mills, rice hullers, oil expellers, fruit pulpers and fruit-juice extractors, solar driers for fruit, vegetable and spice dehydration;
- (c) The storage facilities for processed foods and techniques to ensure the preservation of food nutrients and shelf-life longevity;
- (d) Production of packaging materials, such as cans, bottles, cartons and bags;
- (e) The need to produce a basic, simple and compact unit for processing fruits and vegetables, as well as other horticultural products using simple labour-intensive techniques;
- (f) Designing rural transportation systems for carrying processed food to market centres, such as carts and trolleys that would be easily adaptable to a given situation.

3. Inaugural address of the Minister of Commerce and Industry

The meeting was inaugurated by the Honorable O.S. Musuka, MCC, MP, Minister of Commerce and Industry. He extended a warm welcome to the participants and observers on behalf of the Party and its Government of the Republic of Zambia as well as on his own behalf. He underlined the importance of this meeting to the countries of the subregion as it addressed itself to one of the major constraints to industrialization in Africa as a whole. He pointed out that the African reliance on imported machinery and equipment is draining the foreign exchange. The continent's bill for engineering products was estimated at US\$ 40 billion in 1981 of which US\$ 1 billion was allocated for spare parts. During the period 1980 to 1985, Africa's spare-parts imports amounted to US\$ 25 billion, out of which Eastern and Southern Africa have spent approximately US\$ 6 billion on spare-part imports during the same period.

This heavy dependence on imported technology has greatly hindered the efforts to develop important sectors of economy, namely the machinery manufacturing sector including food processing equipment production. Most of the current machinery is imported; it is supplied to Africa on a turnkey basis with little or no back-up services. The absence of technical documentation, non-existence of personnel training, incontinuity of spare parts supply and the lack of proper maintenance have caused frequent machinery breakage, which has caused a lower-capacity utilization.

The problem of food processing is associated with imported machinery. To overcome this problem, there is a need to promote Africa's indigenous manufacture of machinery, including food processing machinery, which, in the long run most African countries will not afford to import in the quantities required to meet the social and economic goals, to achieve a self-sufficiency of food production and preservation. "It is fundamental, therefore," said the Minister, "for countries of this subregion to work as a team to produce our own simple food processing equipment." Active, private-sector participation, especially at the implementation stage, is expected. Universities, development banks and international organizations should contribute positively towards the success of these efforts. R+D institutions should not hesitate to establish a tight link with machinery manufacturers or businessmen to pave the way to real production of equipment that is designed and tested by R+D institutions. There is no doubt that this co-operation will bring about regional self-sufficiency.

The Honorable Minister concluded his speech by expressing his deep sense of appreciation on behalf of the Government of Zambia and on his own behalf to the United Nations Industrial Development Organization (UNIDO) for taking the initiative to conceive, plan and organize this important expert group meeting.

III. ORGANIZATION OF THE MEETING

The meeting consisted of morning sessions, where country papers were presented and discussed. Technical papers were handled by the technical discussion leaders during the afternoon sessions.

1. Election of officers

Mr. E.M. Pensulo (Zambia) was elected Chairman; Mr. L.L. Kiriana (United Republic of Tanzania) to that of Rapporteur; and Messrs. B.S. Shekimweri, E.K. Abusabah and P.J. Kachepe to the office of Chairman of technical sessions.

2. Adoption of agenda and organization of work

After a slight modification related to the earlier start of the morning sessions by one hour to allow more time for technical discussions, the agenda (see Chapter XI) was adopted unanimously.

IV. PRESENTATION OF COUNTRY PAPERS AND TECHNICAL SESSIONS

Session 1

1. Two papers on the activities of the Ethiopian Food Corporation (EFC) and the Food Research Development Center (FRDC) were presented by the participant from Ethiopia. The following points were raised in this presentation:
 - (a) Little effort is made to develop and modernize traditional food preparation equipment;
 - (b) There is very little attempt to adapt and develop acquired equipment/technologies for the processing of traditional foods from local raw materials;
 - (c) In order to develop design capabilities and facilities for simple food processing equipment, it is necessary to establish research, design and development centres for food processing technologies.
 - (d) In the food processing sector, great care should be taken in the selection of the right equipment as the product is meant for human consumption;
 - (e) The low level of research and development in the Eastern and Southern African subregions is manifested by the lack of an indigenous scientific and technological base;
 - (f) Many raw materials, semi-processed products and ingredients are still purchased from abroad and processed into finished products while many of these raw materials and inputs could have been locally available;
 - (g) There is very little attempt to subject traditional food items to modern production techniques;
 - (h) Optimization in the utilization of available resources is not given adequate attention;
 - (i) Food processing industries focus on limited range of products neglecting the food varieties, which are required by consumers in their ordinary diets; as a result, people continue mainly on homemade foods;
 - (j) The quality of most food products made by simple food processing technologies is generally poor;
 - (k) There are not enough qualified food technologists and specialists in the food processing industry;
 - (l) There is a need for countries of this subregion to formulate policies where simple technologies developed can easily be taken up by industry;

(m) Women play a very significant role in the processing of food. However, it has been noted that in most cases, they are not consulted when simple food processing technologies are being developed;

(n) In the preparation of baby foods, there is a great potential to use traditional foods available in the countries of this subregion.

2. The participant from Botswana demonstrated few drawings of indigenous food processing and preserving equipment, such as the sorghum huller, meat drier and bread-baking oven, which are locally made using available raw materials in the country. The equipment is used by the people in the country as well as exported to the neighbouring countries. He also made the following observations:

(a) Governments of the subregion do not adequately encourage rural development and income-generating ventures to facilitate the establishment of rural cottage industries, as a result people continue to drift to the urban areas;

(b) There is a lack of appropriate food processing and preserving equipment;

(c) Wild plants, found to contain ingredients ideal for the manufacture of pharmaceuticals, are still being exported for processing and sale on the world market.

Session 2

3. In his presentation of the country paper, the participant of Tanzania summarized the following points:

(a) Most economies of African countries depend on agricultural produce; however, there has not been an adequate effort to promote the design, development and manufacture of food processing and preserving equipment;

(b) Adequate efforts have not been made to establish means of exchanging personnel and technical know-how between countries in the region;

(c) In the development of simple food processing equipment, consideration is not often given to available raw materials, manufacturing facilities and skills;

(d) Training of specialists is expensive and, in many cases, involves training abroad;

(e) Industry is reluctant to make for sale developed equipment because of a lack of adequate materials.

4. Being a food technologist, the participant from Burundi talked about her experience on the treatment of rice and cassava to achieve a greater shelf-life longevity. She explained the treatment process of rice using steam

and equipment, which was designed and developed locally and the processing of cassava, also using indigenous techniques and equipment. These attempts have been made to reduce losses, which according to her there is an average loss of 60 per cent in post-harvest produce, which is destroyed because of a lack of suitable food processing and preservation equipment.

The speaker further stated that:

- (a) There is a fall in agricultural production because of the deterioration of arable land, through erosion and poor methods in fertilizer application;
- (b) The demand of food products by the urban population is growing while food production and processing methods in the rural areas have continued to receive little attention from concerned authorities;
- (c) There is a need for the Government to reduce dependence on the importation of food stuffs and, instead, develop policies aimed at increasing locally the food supply;
- (d) Most of the food crops are common staple foods in the region and there is a need to co-ordinate their processing and preservation.

5. A technical paper with a drawing of a suggested locally produced juice presser, using indigenous materials and operated by a hydraulic device, was presented by the participant from Zambia. In the conclusion part of the paper, he wrote that:

- (a) It has been observed that spoilage of agricultural food-produce occurs because often the production volume does not match the proper storage facilities and available food processing equipment;
- (b) Efforts to develop food processing equipment have been hampered by the lack of suitable, local construction materials;
- (c) Simple food processing technologies often used resulted in losses of food nutrients, such as vitamins;
- (d) In the selection of food processing technologies, consideration is often not given to the cost of materials, ease of operating the device and the cost of maintaining the device.

Session 3

6. A second paper of Zambia deals with the problems related to food processing and preserving equipment, a subject which should be addressed thoroughly. The following points are raised in this country paper:

- (a) Most small-scale food producers do not have access to electricity or reliable sources of fossil fuels while wind power and mini-hydros as renewable energy sources are still in an infant stage of introduction. This demands use of manually-operated, animal-driven equipment;

- (b) It has been observed that many developing countries depend on imported resources, such as materials, manufacturing facilities and skilled manpower;
- (c) It is observed that since the majority of the expected users of the simple equipment cannot be expected to have opportunities for formal training in the proper operation and maintenance. This calls for the development of equipment that is easy to operate and maintain;
- (d) It is cautioned that those engaged in the design and development of simple technologies should not confuse the requirements that these equipments be cheap or easy to maintain, they should whenever possible exploit the use of the latest technologies available, such as computer technology in the design and development of such simple equipment;
- (e) There is a need to open up formal information exchange among developing countries involved in the development of such simple equipment;
- (f) "Design Expertise" available is not adequate and, even where it is available, the poor incentive schemes make the experts move from place to place;
- (g) Governments or foreign donors do not adequately fund engineering institutions engaged in the development of simple technologies;
- (h) In cases where some development work of these equipments has taken place, there has not been sufficient funding for the promotion of their use through extension works.

7. The Malawi paper included these observations:

- (a) Design, development and manufacture of food processing equipment have been advancing parallel to the agricultural activities and the level of consumption of the food products in the local market;
- (b) The change of local design in the past years has witnessed little or no progress at all. While a lot failures have been experienced, there has been no effort to improve or modify the design because of the following handicaps:
 - (i) lack of adequate and appropriate skills on the part of the designers;
 - (ii) unfavourable cost of new design and manufacturing methods;
 - (iii) minimal competition in product development;
 - (iv) inavailability of design standards;
 - (v) lack of adequate research facilities to support new innovations.
- (c) Indigenous technologies have been neglected when improved technologies are being developed;
- (d) Design and manufacturing have not been institutionalized; as a result, it has not been possible to build the skills of innovators and designers.

Session 4

8. The representative of Lesotho is a person who is actively engaged in the women and youth segments of the population. After presenting indigenous drawings of food processing and preserving equipment, which were still traditionally made, the speaker accentuated the following facts:

- (a) Food production is seasonal in most countries of the region while adequate food production and preservation techniques have been developed;
- (b) Women constitute the largest population percentage engaged in food production while men are mostly employed in the towns;
- (c) The major source of energy in food preparation is wood, cow dung or plant remains after harvest and efforts are being undertaken to improve and optimize the use of these traditional energy sources;
- (d) Traditional cooking stoves still play a vital role in food preparation in most African households while their improvement and development has received little or no attention from technologists;
- (e) Solar cookers and ovens can be developed using locally available materials to harness the solar energy for food preparation;
- (f) There is a need to establish a regional institution to train technicians on appropriate/relevant technology;
- (g) There is a need to establish a regional forum/magazine on the dissemination of information on appropriate technology on food processing and food preservation;
- (h) There is a need to select one country of the region to act as Co-ordinator of appropriate technology development;
- (i) There is a need for governments of the region to draw clear policies on the development and promotion of appropriate technology;
- (j) There is a need to establish a central data processing with an emphasis on construction of devices;
- (k) Emphasis must be put on technologies that supplement or complement food processing and food preserving, clean-water provision and storage, health and sanitation, washing and provision of simple housing;
- (l) There is a need for countries of the region to establish "community development centres" in the rural areas where the majority of the population dwell so that governments can easily promote the development, acquisition and maintenance of simple technologies.

9. The participant from Sudan extensively talked about the use of molasses for the production of sugar syrup. He prepared some drawings of equipment used for this production. He observed further on that:

- (a) There is a need to conduct research to use molasses for the local production of sugar syrup;
- (b) There is a potential to use cotton stalks, groundnut shells and baggasse (sugarcane remains) as an alternative fuel on domestic and industrial scales;
- (c) Use of local clay (Jardiga) can be used as a bleaching agent;
- (d) There is a potential to locally develop soft-drink concentrates rather than to rely on imported concentrates;
- (e) Potential for production composite flour (30 per cent sorghum, 70 per cent wheat) for bread to reduce the import of wheat;
- (f) It has been observed that where some food crops are exported to earn foreign exchange, governments should ensure that the exportation does not create shortages of that good in the local market and instead the government should promote its increased production in the rural areas.

10. Tanzania contributed several drawings of food processing equipment, which were developed in the country by local engineers. The speaker said:

- (a) There is a need to tackle the problems of adoption and explore technologies for other food processing machines;
- (b) There is a need for co-ordination and collaboration among the national, regional and international research and development institutions to optimize the use of resources;
- (c) The cost of raw materials, especially steels for manufacturing simple food processing and preserving equipment, is very high compared to the purchasing power of the small-scale farmers. As a result manufacturers also become reluctant to produce these devices on the commercial market;
- (d) The design and development of food processing equipment is limited by the lack of R+D engineers;
- (e) Non-consideration of social and cultural conditions has always limited the use of developed technologies by women.

Session 5

11. The participant from Uganda provided several drawings of food processing machinery developed by his own small company. He observed that:

- (a) There is a tendency for the local population to prefer imported technologies;

(b) Small industries play a major role in the promotion of the design and development of simple technologies but some governments in the region are yet to give adequate attention to the establishment of small industries;

(c) The establishment of small-cottage industries in the rural areas could have been stimulated if government made efforts to invest in the provision of electric power to the rural areas.

12. A food processing equipment manufacturer from Zambia also took the floor and raised the following points:

(a) There is an inadequate supply of raw materials;

(b) Standard parts such as bearings have to be imported while manufacturers sometimes do not obtain foreign exchange to import these standard parts;

(c) Locally manufactured products have to compete with similar products, which continue to be imported;

(d) There is a need to overcome the view by end-users that locally made products are inferior to imported ones;

(e) High sales taxes are charged even on simple, locally made equipment earmarked for use by the majority of the population;

(f) Adequate provisions are not made by some manufacturers to supply adequate spare parts for equipment developed locally, thereby making the promotion of using local equipment difficult.

13. The second participant from Sudan primarily addressed the low-income farmers and showed the audience how traditional stone-flour mills could be improved to enhance its performance. Different drawings of that equipment are provided in his paper. He drew these two conclusions:

(a) The processing of food grain plays an economically important role because processed food grain is the major staple food, especially for low-income people;

(b) The use of appropriate technologies for the processing of grains--if given its due importance--may contribute greatly to the achievement of socio-economic objectives, such as employment and the saving of foreign exchange.

V. TECHNICAL VISITS

The morning programme brought the participants to an appropriate technology workshop at Kasisi, which is situated outside the city, to NCSR and to TDAU, which is located at the University of Zambia complex.

Kasisi Agricultural Training Centre

This is a small, church-run training centre intended to help nearby families to improve agricultural methods. During their two-year stay at the centre, the trainees are required to invest the proceeds from the sale of their production in the acquisition of oxen and implements to take back to their villages.

Attached to the Centre is an appropriate technology workshop to make ox-drawn equipment such as carts, harnesses, ripper/planters, etc. The centre also has a small unit, which makes fibre-cement tiles and expressing oil from sunflowers.

Performance tests of three types of sunflower oil-expressing units locally manufactured by the Lutanda Machine Tool Factory were operating. The participating engineers from different countries were given the opportunity to see the performance of each unit and to give their views to the manufacturer as well as to the management of the Kasisi workshop to improve the design to enable better achievement.

National Council for Scientific Research (NCSR)

The National Council for Scientific Research is an organization created by the Government to promote and co-ordinate scientific research and activities within Zambia. One of its specific functions is to encourage branches of science and technology, which have unique Zambian conditions as their field of study. The Council has, among other units, the Food Technology Research Unit which, through its Engineering Section, is involved in the design and fabrication of low-cost food processing equipment.

Technology Development and Advisory Unit (TDAU)

TDAU is a unit in the School of Engineering of the University of Zambia. Its objectives are: (a) to help and advise on the design and production of agricultural and household equipment locally; (b) to serve as a development center for new equipment and processes aimed at replacing imported models; (c) to act as a clearing house for designs and prototype development for other organizations; (d) to stimulate grassroot development of rural areas towards self-sufficiency; and (e) to serve as a centre to pool advice from the University to various local industries. Since its inception, the Unit has been heavily involved in the design and development of food processing equipment, such as the hand-operated maize sheller, groundnut sheller, sorghum dehuller and sunflower oil-expressing units.

The afternoon technical visits were made to two institutions: Village Industry Service (VIS) and Softdrink Factory.

Village Industry Service (VIS)

VIS is one of many organizations created to promote the grassroots development through providing various types of assistance and support services to small entrepreneurs. The organization is registered as a society and operates on the lines of a non-governmental organization.

VIS is mainly concerned with rural development to promote intensive labor, agro-based cottage and village industries, whether individual or co-operatives, which encourage income creation, utilize local resources; these are based on simple equipment and machinery. Over the years it has identified potential for cottage industries in food processing, metal fabrication and blacksmithing, woodwork, chemical processing, textiles, woodcraft and leather goods.

Softdrink Factory

This factory is producing softdrinks made of locally available oranges, mangos and other indigenous fruits. It is a modern and well-equipped factory, a fact which is contrary to the subject of the experts' group meeting.

VI. SPECIAL SESSION ON UNIDO

The structure of the organization of the United Nations Industrial Development Organization (UNIDO), its organigram and its financial resources to execute the mandates given by the member states were explained to the participants and observers. The audience was also informed about the technical co-operation activities, the consultations fora and the industrial and technological data.

Regarding technical co-operation, different financial modes were explained. There is the possibility of using these different funds: Indicative Planning Figure (IPF), Industrial Development Fund (IDF), Regular Budget (RB), Special Industrial Services (SIS) or Trust Funds (TF).

The procedure of submitting an official request for technical co-operation with UNIDO was discussed extensively. Guidelines on preparing project documents for small and large projects were described. Several samples of project documents were distributed to the participants.

Regional co-operation was recommended to allow them to exchange experiences and unbureacratic transfer of applied technologies.

VII. RECOMMENDATIONS

The Expert Group Meeting adopted these recommendations after six sessions and several days of discussion:

- (a) Efforts should be made to develop and modernize traditional food-preparation equipment;
- (b) Efforts should be made to adapt and develop equipment for traditional food processing from local raw materials. Great care should be taken to select equipment as products are meant for human consumption;
- (c) To develop design capabilities and facilities for simple food processing equipment, it is necessary to establish research, design and development centres for food processing technologies;
- (d) A survey should be conducted to ascertain raw materials and inputs available in each country in order to find alternatives for import substitution;
- (e) Optimization in the utilization of available resources should be given adequate attention, i.e. men, money, materials and equipment;
- (f) Food processing industries should focus on all nutritional requirements of the consumers;
- (g) There must be fully qualified food technologies, who must ensure good-quality food products;
- (h) The governments of Eastern and Southern African subregions should:
 - (i) formulate policies to develop an indigenous scientific and technological base (In particular they should formulate policies on how simple technologies can be developed and the way they can be easily taken by industry);
 - (ii) institutionalize the co-ordination of activities.
- (i) Women should be consulted when simple food processing technologies are being developed;
- (j) There is a project proposal to prepare babyfoods from locally available materials;
- (k) The governments are strongly urged to establish rural and cottage industries;
- (l) A project proposal is recommended for processing equipment for indigenous plants containing ingredients ideal for the manufacture of pharmaceuticals. Such plants should have governmental protection;
- (m) There is a need to establish a Directory of institution experts and available raw materials in the region;

(n) There should be a co-ordinating committee with a representative from each country represented, to spearhead the implementation of recommendations that evolved from this meeting;

(o) A meeting of this nature should be reconvened regularly to find the progress made by member countries and to share experiences;

(p) UNIDO and member countries should be urged to assist in strengthening design, development and manufacturing capabilities of R&D institutions through the provisions of training opportunities and exposure tours;

(q) A ministerial conference should be convened to explore possibilities;

(r) There should be a voluntary organization whose main purpose would be the promotion of equipment development.

VIII. ADOPTION OF THE REPORT OF THE MEETING

The report of the meeting was adopted at its final session and the amendments were proposed. It authorized the UNIDO Secretariat to finalize the report in light of those amendments, as well as to complete Chapters I through VI and VIII through XI. Upon the completion and reproduction of the final report, UNIDO will distribute it to all participants, observers and other organizations/participants/institutions interested in the proceedings.

IX. CLOSING SESSION

At the formal closing session, a vote of thanks was proposed by the Chairman, Mr. E.M. Pensulo, on behalf of the participants and his countrymen from Zambia.

The participants were greatly honoured by the presence of the Honorable Mulondwe K. Muzungu, Minister of State for Commerce and Industry, at the closing session. His attendance gave clear testimony to the importance that his government attached to the meeting, as it dealt with simple equipment, which will satisfy the primary needs of the African population.

Speaking on behalf of the organizers of the meeting, a representative of the Director-General of UNIDO extended his particular thanks to the Government and to the people of Zambia for their warm and brotherly hospitality, as well as for the excellent facilities and logistical support they had provided. He also thanked the co-organizers for their fruitful co-operation and to the participants for their contributions to the Expert Group Meeting.

In his statement, the Honorable Mulondwe K. Muzungu stressed the importance of designing and manufacturing of simple food processing and preserving equipment, which by their nature are employed in the establishment

and operation of small-scale industries as a means for accelerating their economic growth. He pointed out that small-scale industries are not capital intensive, but labour intensive; they need small investments but generate more employment. They use indigenous raw materials and, therefore, save foreign currency outflow; they give a direct socio-economical impact in the equitable distribution of income, mobilization of capital and human resources, stimulation of the growth of industrial entrepreneurship and filling the gap left by big industries.

He noted that although considerable efforts in facilitating the development of small-scale industries have been made, serious constraints in the design and manufacture of food processing and preserving equipment are faced by the people of this subregion. The tendency, therefore, has been to transport the agricultural products over long distances and at a great cost to urban areas for processing.

He pointed out that the solution of the above problems lies in the design and manufacture of simple food processing equipment, which can be made available in the rural areas and centres of food production so that the farmers can both produce food crops and cheaply process them locally into finished products. This is the challenge to all gathered experts at this meeting to spearhead the action in design and development of prototypes, which can be passed onto food processing and manufacturing units for industrial production and in conjunction with engineering firms establishing pilot plants for food processing.

He also appealed to all member states of the subregion to become members of the Africa Regional Centre for Engineering Design and Manufacturing (ARCEDEM) and to benefit from the Centre offers for courses and training in the design and manufacture of various machine tools.

In closing, the Minister expressed his appreciation to UNIDO for having chosen Zambia to host the Meeting.

X. LIST OF PARTICIPANTS

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United Nations system

A representative of UNICEF, and representatives of UNIDO and a UNIDO Senior Industrial Development Field Adviser (SIDFA) also participated in the meeting.

XI. AGENDA

First day, Monday, 9 January 1989

Opening Session (10:00)

1. Registration
2. Introduction by National Organizer
3. Address of UNIDO Representative
4. Address of a member of the Government of Zambia
5. Vote of thanks
6. Election of the Chairman and Rapporteur of the Expert Group Meeting
7. Adoption of the agenda

RECESS (12:00-14:00)

Session 1 (14:00-17:00)

1. Presentation of country papers by Ethiopia and Botswana (approximately 40 minutes each, including a question-and-answer session)
2. Technical session on the design of food processing/preserving equipment. Technical Paper to be presented by Tanzania under the chairmanship of Zambia.
3. Discussion of technical paper in working groups
4. Group reports

Second day, Tuesday, 10 January 1989

Session 2 (09:00-12:30)

1. Presentation of country papers by Tanzania and Burundi (approximately 40 minutes each, including a question-and-answer session)
2. Technical session on the design of food processing/preserving equipment. Technical Paper to be presented by Zambia under the chairmanship of Tanzania.
3. Closing remarks by the Chairman
4. Discussion of selected topics in working groups

RECESS (12:30-14:00)

Session 3 (14:00-17:00)

1. Presentation of country paper by Zambia (approximately 40 minutes, including a question-and-answer session)
2. Technical session on the manufacture of food processing/preserving equipment. Technical Paper to be presented by Malawi under the chairmanship of Sudan.
3. Closing remarks by the Chairman
4. Working groups on final report

Third day, Wednesday, 11 January 1989

08:10 Departure, Ridgeway Hotel
09:00 Kasisi
10:30 National Council for Scientific Research
12:15 Technology Development Advisory Unit/University of Zambia (UNZA)

RECESS 13:00-14:15

14:15 Departure, Ridgeway Hotel
14:30 Chinika Small Industry Complex

Fourth day, Thursday, 12 January 1989

Session 4 (09:00-12:30)

1. Presentation of country papers by Lesotho and Sudan (approximately 40 minutes each, including a question-and-answer session)
2. Technical session on the manufacture of food processing/preserving equipment. Technical Paper to be presented by Tanzania under the chairmanship of Malawi.
3. Closing remarks by the Chairman
4. Working group on final report

RECESS (12:30-14:00)

Session 5 (14:00-17:00)

1. Presentation of country paper by Uganda (approximately 40 minutes each, including a question-and-answer session)
2. Technical session on raw materials for food processing/preserving equipment. Technical Paper to be presented by Sudan and Zambia under the chairmanship of Ethiopia.
3. Closing remarks by the Chairman

Fifth day, Friday, 13 January 1989

Session 6 (09:00-12:30)

1. Discussion on the technical co-operation scenario
2. Discussion of the draft final report
3. Closing remarks by the Chairman

RECESS (13:00-14:00)

Session 7 (14:00-17:00)

1. Final review and adoption of the final report
2. Address by the Representative of UNIDO
3. Address by the National Organizer
4. Closing address by the Representative of the Government of Zambia