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Expert Group Meeting on Indigenous food Technology

Addis Ababa, Ethiopia
22-23 November 2001

Report of the

Ad hoc Expert Group Meeting on Indigenous Food Technology for Food Security in Africa

I. ATTENDANCE AND ORGANIZATION

1. The Ad Hoc Expert Group meeting on Indigenous Food Technology for Food Security in Africa was held in the United Nations Conference Centre (UNCC), Addis Ababa, Ethiopia, from 22 to 23 November 2001. The Meeting was formally opened by Mr. Josué Dioné, Director of the Food Security and Sustainable Development Division of the Economic Commission for Africa (ECA) after brief welcome remarks by Mr. Don Oben, Coordinator of the Meeting.

2. The meeting was attended by Experts from Indigenous Knowledge Institutions in various African countries as well as from the Organization of African Unity (OAU), Food and Agriculture Organization (FAO) and the International Livestock Research Centre (ILRI). The Meeting was also attended by the staff of the Food Security and Sustainable Development Division (FSSDD) and other Divisions of ECA. The list of participants is provided in Annex 1.

II. ACCOUNT OF PROCEEDINGS

A. Opening of the Meeting (Agenda Item 1)

3. Mr. Don Oben, coordinator of the meeting made introductory remarks.

4. Mr. Josué Dioné, Director of FSSDD welcomed the participants and placed the meeting in the context of food insecurity in Africa. Food insecurity he said, affects one African out of three and is expected to get even worse in the years ahead in certain parts of the Region due to rapid population growth, limited additional land that can be brought under cultivation, and the degradation of the natural-resource base, including loss of soil fertility. Increasing the productivity of the food and agriculture systems is thus not a mere matter of choice; it is an essential condition for long-term food security and sustainable development. And, raising the level of development and application of appropriate technologies constitutes undoubtedly, one of the fundamental elements of any strategy aiming at boosting and sustaining productivity in the food and agriculture sector.

5. Mr. Dioné recalled that improving and intensifying the application of food production technologies in order to increase the level of food production will solve only part of the problems related to food insecurity. Post-harvest technologies in critical areas such as food storage, processing, preparation, preservation and packaging must also play a significant role. There is no doubt that selective and intelligent borrowing of modern foreign technologies can help. But, a viable and efficient strategy calls for careful consideration of traditional technologies that have been or can be upgraded for wide application and broad-based benefit to the African population. Indeed, many modern technologies are either hard to acquire for economic or financial reasons or unsuitable to the socio-cultural African context. Moreover, foreign technologies simply do not exist for either solving some of the specific problems or meeting the whole spectrum of technological needs of African countries. Technological development and application, relying in many instances on indigenous knowledge and technologies, is therefore an important part of any real solution to the problem of food insecurity in Africa.

6. Mr. Dioné highlighted the fact that during the last two decades, science and technology policy experts have come to recognize increasingly that, in some areas of development, indigenous technologies provide the foundation for socio-economic progress. Food storage, processing, preservation and packaging are good examples of such areas where technological development has generally been overlooked by policy-makers. Owing to the influence of the training that had often been acquired in industrialized countries, policies in most African countries have tended to systematically attach greater importance to imported technologies and less attention to indigenous technologies in general and to those used almost exclusively by women in particular. A concrete example was given to illustrate the potential of indigenous food technologies for food security and sustainable development in Africa and some of the factors constraining their wide diffusion.

7. The Director drew the attention of the participants to the objectives of the meeting which were: (1) to get a better understanding of the role and importance of indigenous food technology for sustainable food security in Africa; (2) to share views on issues and best practices in this area; (3) to formulate recommendations for increasing the contribution of indigenous food technology to food security; and (4) to provide guidance to ECA in this area.

8. Mr. Dioné called upon the participants to share their views on the best practices regarding critical actions that need to be taken in order to promote potentially beneficial indigenous food technologies. More explicitly, he called upon the participants to share their experience and expertise on five distinct but interrelated groups of issues:

   a. How to identify, describe and record information on the best technologies that can be shared and exploited more broadly and provide greater benefits to Africa. How to encourage policy-makers to pay greater attention to these technologies. Which organization should be encouraged to take the lead in developing a comprehensive database and website on indigenous food technology?

   b. How to validate, test or assess selected technologies in 'laboratories' and in different agro-climatic, socio-economic and cultural environments. How to make sure that these technologies really do what they are supposed to do and that there are no better alternative technologies.

   c. How to protect and remunerate the owners or the innovators of the technologies. Alternatively, what mechanisms can be used to ensure that the technologies and innovations bring benefits to those (individuals or local communities) who have developed them?

   d. How to exploit, transfer, commercialize or 'industrialize' the technologies. Alternatively, how to move the technologies from the 'familial', 'artisanal' or 'anthropological' domain into the realm of business and micro or small business enterprises.

e. And finally, how to raise the challenge of developing indigenous technologies on the political agendas of governments. What institutions, if any, need to be setup and what kind of support needs to be put in place for the promotion of these technologies? How to strengthen public-private partnerships within and among the countries of the region in order to achieve potential economies of scale. In other words, what can or should governments do to promote promising indigenous food technologies? What should be the appropriate roles for NGOs, and UN institutions?

9. Mr. Dioné concluded by stating that the promotion of indigenous food technologies can only be a scientific, social, economic, legal, cultural and political process; hence the complexity of the challenges and the very reason why ECA has taken the initiative to convene the meeting of experts.

B. Organizational Matters (Agenda Item 2)

10. In order that the participants may get to know one another before the Meeting starts its business the Director requested the participants to introduce themselves after which he called for nominations for the posts of facilitator and rapporteur.

i) Election of Officers

Facilitator: Professor Tunji Titilola

Rapporteur: Dr. Leguet GANOU

ii) Adoption of the Agenda and Programme of Work

11. The Meeting adopted the Agenda and Programme of Work as in Annex 2 and 3 respectively.

C. Proceedings of the Meeting (Agenda Item 3)

12. **Indigenous Food Technology for Sustainable Food Security**:

Presentation of key note Address - Indigenous food technology: policy issues for consideration in supporting indigenous food technology to enhance food security in Africa (Agenda item 3, First Session)

13. The guest speaker introduced the subject matter by elaborating briefly on Africa's poor socio-economic condition which is mainly characterized by wide spread poverty and inadequate food and nutrition situation, and which is aggravated by high population growth rate and HIV/AIDS pandemic. He said that several strategies have been proposed to address this unacceptable situation but progress has been slow because of the persistent poor performance of agriculture.

14. The speaker observed that the management of agricultural post-production systems (marketing, storage, processing, distribution) which influences agricultural performance and food security, can help to solve the above problem. Food processing and associated activities, in particular, are important factors in the promotion of food access and the production of safe and nutritious foods. Further, the bulk of foods consumed in many African countries are converted into edible forms using indigenous food technologies (IFTs). Unfortunately, the role of these technologies in the attainment of food security has not been fully addressed by the many paradigms characterizing agricultural development in Africa. As a result, the underlying technologies have not received much attention from the scientific community.

15. Other key aspects of the presentation were the characteristics of food technology and traditional food processors in Ghana, the probiotics and neutraceuticals, and the policy issues on indigenous food technology.

16. The type of foods consumed by any population, the methods of handling, processing, marketing, distribution and utilization are deeply rooted in tradition and experience and these have led to the development of IFTs. The latter are based on knowledge, experience, art, culture and belief systems and distilled through experiences over several centuries. They affect the economic and social life of the operators, are simple, labour intensive, predominantly home-based and controlled by women. They are, however, time consuming, have variable process parameters along with poor or non-quality control, and their conditions for application may be unhygienic.

17. Field survey was identified as one of the seven critical paths followed by the speaker's work on IFTs in Ghana. This survey was on the profile of the operators of these technologies, the raw materials used, the process followed, the characteristics of the products, the marketing and the storage of traditional foods. One of the important lessons learnt from the survey was that the predominantly female operators, some of whom are inventors in their own right, are involved in both the processing and the retailing of their products. They are, for that matter, processor-retailers and have a rich store of valuable knowledge unknown to the scientific community.

18. The issue of live microbial food ingredients that have a beneficial effect on human health and that are referred to as probiotics was addressed in connection with African indigenous food technology products. The speaker stressed that the potential for African food technology products to have probiotic properties is considerable and that African scientists need to fully study these products in order to identify the properties for commercial use. Likewise, processed foods which contain ingredients that aid specific body functions in addition to nutrients and that are referred to as neutraceuticals should be given a thorough research attention as it is possible that some of the products of Africa's indigenous food technology could be classified as neutraceuticals.

19. The key policy recommendations were highlighted. Some of these were associated with the need to give appropriate support to agriculture and the rural sector; document IFTs in Africa using modern means; undertake environmental, sociological, economic and technical scan of IFTs and determine their Food processing and associated activities are important factors in the promotion of food access and the production of safe and nutritious foods, most development and poverty reduction strategies will fail. Others were related with upgrading

of the technologies; standardization and quality improvement; education of the operators; research, development and extension; hazard analysis critical point; packaging; study of impact of emerging techniques on the improvement and upgrading of IFTs; and recognition of women who apply IFTs.

General debate

20. Following the presentation by the guest speaker, the chairperson invited experts to make comments and/or observations. He reminded experts that during their presentations and discussions, they should bear in mind the five outputs expected from the meeting as indicated by the Director of FSSDD in his opening statement.

21. The representative of the International Livestock Research Institute (ILRI) observed that the guest speaker did not elaborate on the processing of animal products which could help highlight the importance of indigenous food technology (IFT) within this sub-sector. The guest speaker agreed with this observation and said he was constrained by time during his presentation, hence the reason for not elaborating on other areas of the topic at hand. He, however, made mention of cheese locally produced in Ghana as an example in which IFT is employed in the livestock sub-sector. He also cited the case of traditional hunters who used herbs and extracts to preserve game meat while still in the forest. He, however, lamented that these meat preservation techniques have not been researched and documented.

22. On the question of the background / profile of IFT operators, he replied that any person engaged in IFT-related activities was considered an operator and that, by and large, operators are women managing micro or small-scale enterprises.

23. An expert wanted to know whether a local Ghanaian food "kenke" produced from fermented cassava dough using IFT contains aflatoxin – a cancer-causing agent. In response to this question, the guest speaker said that any grain under poor storage conditions runs the risk of being contaminated with undesirable organisms including those producing aflatoxin. Proper post harvest treatment and storage is therefore an important prerequisite to ensuring food quality and safety.

24. On the subject of probiotics and its connection with IFT, he stated that there is increasing recognition that in addition to traditional food nutrients, certain foods contain microbial food ingredients with beneficial health effects such as those which minimise the incidence of cancer in humans. It is believed that African indigenous food products contain such useful ingredients which, if exploited, could result in huge economic benefits given that probiotics have an emerging and rapidly growing market.

25. The delegate from South Africa commended the guest speaker for his very interesting presentation. He highlighted some observations made by the speaker, which were quite similar to some of his experiences in the field. He reiterated that one's ability to access food is very much linked to one's income and as such, the creation of employment should be seen as integral to the development of IFT. He cautioned that in introducing technology to indigenous food processing, care must be taken not to marginalize local people. He was, however, optimistic that in developing IFT, it is possible to target both the local and international markets. An example of using dual marketing strategies in South Africa is beer brewing. The industry is divided into small-scale home breweries and large scale industrial

processing. Finally, he emphasised the need to explore the possibility of using locally produced yeast to make beer rather than importing the yeast which is currently the norm in most African countries.

26. At the end of the discussions, the chairperson thanked the presenter for touching on so many important issues relevant to IFT. He concluded by stating that the market for IFT exists but given that a lot still remains to be done to be able to access international markets, Africans must act now.

Ms. F. Hymore: ARMCON Association Ghana/University of Ghana

27. Ms. Hymore stated that nearly every home in Africa uses traditional products like fermented maize produced in one form or the other. Encouragement of scientists to use modeled studies could lead to identification of some products that could be useful for treatment of diseases. Knowledge of simple but effective cheap, convenient, readily available maize medical food products (nutraceutical products) for home/community treatment of out-breaks or individual incidence of cholera and common diarrhea cases, could go a long way to reducing the high infant morbidity and mortality rates in Africa.

28. In recent times, fermented maize gruel, a traditional preparation which mothers commonly feed to their infants in many parts of Africa, has been shown to have antimicrobial activity against diarrheal pathogens. Diarrhea is a common food-borne disease mainly caused by contamination of foods under unhygienic conditions with enteropathogens like E. coli and Shigella spp. Fermented maize preparations containing malt and cowpea at levels suitable for treatment and prevention of Protein Energy Malnutrition have not been tested for their antimicrobial activity and need to be studied so they can be recommended for prevention/treatment of PEM and Diarrhea.

29. The effects of process variation – cowpea-fortification and malt-addition on the anti-microbial activity of fermented maize, were investigated using a central composite rotatable design. Suspensions of the cooked and uncooked formulations were tested for antimicrobial activity using disc diffusion assay procedures. All product combinations had some degree of antimicrobial activity. The uncooked products showed greater zones of inhibition i.e., higher anti-microbial activity than the cooked products. Cowpea and malt had antimicrobial activity but unfermented maize had none. However, fermented maize had antimicrobial activity which increased with fermentation time. Addition of cowpea enhanced antimicrobial activity synergistically with fermentation. The combined effects of malt and cowpea addition enhanced antimicrobial activity so that a shorter fermentation time produced optimal antimicrobial activity. The products with highest antimicrobial activity, however, were obtained from 8% cowpea fortified maize at 12 h of fermentation containing 2% malt adjunct.

30. Some findings suggest that when properly formulated, Maize-Cowpea-Malt blends are safe and may find additional functional application as health foods or food supplements in treatment and prevention of diarrhea. Fermented maize-cowpea and malt blends, may therefore, be recommended for use in treatment and prevention of protein-energy malnutrition if further studied. Their application at the community and home levels could also result in the preservation of many adult lives as it is hoped that some of the products when adequately produced could also find possible useful application in diarrhea related to

the AIDS disease. These findings would then lead to reduced medical care costs, result in improved health for many, enhance productivity and boost or sustain development.

31. The application of Science and Technology for re-engineering of traditionally processed maize could lead to the development of new and better food products which in turn, could lead to improved health and socio-economic development. Since they already are staples in the diets of many Ghanaians and other Africans and have been widely studied, they may be appropriately re-formulated into neutraceuticals for the treatment of different diseases in Africa.

Mr. Harcourt, FOODTEK, CSIR, South Africa

32. Mr. Harcourt said that Indigenous Food Processing Technologies are those technologies that are based upon indigenous knowledge and experience that can, but do not necessarily, have to use indigenous produce. These technologies have the potential to make contributions to Food Security in Africa in four ways namely improvement in food accessibility, availability, nutritional value of foods and food safety.

33. Mr. Harcourt gave examples of existing products/activities and their potential in these areas. The objectives that should be pursued include: Improvement in food accessibility through increased income resulting from the commercialisation of indigenous foods; Improvement in food availability by broadening the household level implementation of indigenous technologies through documentation and dissemination; Improvement in nutritional value of foods based upon documenting and disseminating household practices; and improvement in food safety through the identification of appropriate indigenous technologies.

34. Problems associated with indigenous technologies include: access to remote markets; the risks that can arise from the indiscriminate adjustment of indigenous technologies that have evolved because of their inherent safety; the difficulty of immediately implementing Hazard Analysis of Critical Control Points (HACCP) in small scale enterprises if international marketing is targeted; the move away from tradition in some communities.

35. Mr. Harcourt emphasized the need for implementation of real and applicable intellectual property ownership, as well as the need for improved sharing of information on successes, capacity building in quality management, low cost quality measurements and systems; improved access to packaging; training in enterprise implementation; development of strong branding, possibly with regional brands; implementation of a generic marketing campaign; and development of strengthened enterprise business planning capacity building on niche markets rather than commodity products.

36. The need for assembling, evaluating, packaging and disseminating information that is critical in the non-business utilisation of Indigenous Food Processing Technology was also underscored.

Dr. Patrick Maundu, KENRIK

37. The presentation by Dr. Patrick Maundu was based on one of the projects of the Kenya Indigenous Knowledge Centre (KENRIK). This is the indigenous food plants program which has resulted in the documentation of all food plants in Kenya (1989-1994) and published in a book on the traditional foods of Kenya. The work of the project shows that indigenous food plants have a lot of potential in alleviating food insecurity and poverty. In Kenya, 850 species of plants are used for food. In Africa, close to 4,000 species of plants have the potential for producing food. These plants need to be exploited and used to alleviate poverty. The center with the assistance of International Plant Genetic Resources Institute (IPGRI) is also implementing the program on leafy vegetables. There are about 1,000 species in Africa used as leavy vegetables.

38. After briefly highlighting some of the work of KENRIK, Mr. Maundu gave an overview of the importance of indigenous food technology in Kenya. With over 40,000 plant species and over 1000 ethnic groups, Africa has both the cultural and plant diversity needed to invigorate its economy of. Close to 4,000 plants are used by its people for food. These include food such as fruits, cereals, legumes, leafy, tubers and roots and many non-foods such as gums and additives. The high cultural diversity offers the continent a high choice of indigenous knowledge and related practices such as food processing techniques and recipes. In spite of this great potential and the wide range of opportunities, indigenous knowledge has not been effectively used to reduce current widespread malnutrition and poverty in Africa, a failure which Mr. Maundu attributed to a number of constraints. Mr. Maundu then went on to examine these constraints as well as Africa's potential in alleviating the health and economic status of its people using some of the work done on traditional leafy vegetables.

39. According to him about 1000 traditional leafy vegetable species are utilized by the people of Africa. Top of the list are well known vegetables such as the cowpea (Vigna unguiculata), Amaranthus, Spiderplant, Rosele (Hibiscus sabdariffa) and a range of Solanum species. Many less known species exist which are, nevertheless, locally important. They include Vatovaea pseudolablab which is endemic to the dry parts of eastern Africa.

40. Traditional vegetables are generally rich in micronutrients such as vitamin A and Iron – two common deficiencies in Africa especially among children and women in the child bearing age. In addition, others are medicinal. Traditional vegetables can thus alleviate malnutrition in Africa and enhance the health of its people. Within most species, there exist varieties with special characteristics of interest to specific groups of people. The genetic base exists for development of varieties with desirable qualities e.g. high yields, better tasting etc. Traditional vegetables are accessible and technologies for utilizing them are available within the communities. Production and utilization can be achieved with minimum technological and financial inputs. Traditional vegetables are a major source of income for local people especially women as they are the major producers, processors and sellers.

41. Dr. Maundu said that the optimal use of traditional vegetables in Africa is, however, hampered by a number of factors. The key ones include: the negative attitude of most people to these vegetables, the lack of appreciation for the taste and the difficulty of having the seeds. Also, few of the vegetables have a market outside their country of production while local markets are poor due to low demand and over overproduction in certain seasons. Research in various aspects such as agronomy and nutrition lags behind. The little research results achieved do not reach extension staff and farmers effectively. There is a lack of know-how. For example, many would-be users of traditional vegetables especially urban dwellers do not know how to prepare them. In fact, indigenous knowledge is being lost by the day as the more elderly people with this knowledge die out. Some key varieties especially of cultivated species such as cowpea have been lost or are threatened with extinction. These need to be collected, documented and preserved for the future. Agricultural policies of many countries do not put adequate emphasis on traditional leafy vegetables but rather on export cash crops. Government ministries need to give budget allocations for work on traditional foods. Many individuals and institutions within countries and in Africa as a whole are involved in traditional food research and extension work. These work in isolation thus duplicating efforts and wasting funds. There is also the problem of pests and poor soils.

42. Dr. Maundu then identified the following as the lessons learned from indigenous knowledge on leafy vegetables:

- Farmer to farmer transfer of technology seems to be more successful than if extension staff did it.
- Promotion of leafy vegetables using such positive aspects as their high nutritional value has been known to have a wide impact.
- Seed production by community based groups and use of simple technologies such as in packing can not only provide seeds locally but for other areas.
- Simple selection processes by communities led by researchers can produces varieties with required characteristics in enhanced form. Yield for example can easily be doubled or tripled.
- While some groups of people may dislike certain characteristics such as bitterness, other groups appreciate this. This disparity can be used to produce products targeting particular groups. This will in the long run maintain the diversity of the species.
- Markets are flooded with vegetables in certain seasons. Preservation techniques such as drying can provide the vegetable during times of low production. Simple sun-driers have been developed by researchers with community participation.
- Indigenous processing technologies including recipes made available especially to restaurants and urban dwellers can lead to increased consumption of leafy vegetables.
- Participatory research in agronomy, recipe development, etc, can lead to high adoption rates.
- A number of countries have carried out surveys on traditional foods and maintained databases.

43. Dr. Maundu identified other areas of intervention. These includes: the need to develop databases on research done and the institutions and individuals involved in such research on traditonal leafy vegetables, the need to step up documentation of traditional food technologies as well as the need to promote and strengthen research in agronomic, nutritional analysis, toxicity and microbiology.

44. In conclusion Dr. Maundu said that the high diversity of species and traditional food technologies offered Africa the choice necessary to initiate viable economic ventures geared towards poverty reduction in the region. This diversity makes it possible to target products to various groups based on their uses and taste. In order to develop and expand the market for these products, it was important to develop databases to document IFT and recipes and create connectivity among individuals and institutions in this area.

45. To target products to various groups based on their issues and taste.

Mr. W. Chipfunde, ZRCIK, Harare, Zimbabwe

46. Mr. Chipfunde gave a historical perspective to IFT in Africa. According to him, archaeological findings show that African agriculture started several milennia before the Christian era. For example archaeologists put "early dates for domesticated wheat/barley from the western desert of Egypt, around 7000 BC. Evidence of animal husbandry (sheep/goat) dating back to around 6000 BP, is also given. This means that African food technologies have not only withstood the test of time but have also spread across the globe.

47. He said that food production is much more than just an economic or nutritional activity. Food production and consumption is the centre of African culture around which values, rituals, and social practices evolve.

48. Food production, processing and consumption is very much a social, cultural and above all, a political process. The food chain reflects the intricate balance and relationship between the rich and the poor, the powerful and the weak, victors and the victims. Policies that aim at enhancing African food security through indigenous food technologies need to appreciate this historical background. Failure to do so will lead to serious difficulties. In many cases African scholars, researchers and academics get their theoretical bearings from European perspectives according to how they were taught to understand the world. As such, it is difficult for many of us to think of approaches to food technologies outside the framework of western scientific thought and technologies. Whenever a situation of juxtaposing African and European knowledge systems arises, the tendency is to attempt to qualify, validate and measure African knowledge by western science. The superiority of western science is presupposed; yet this (superiority) is less a fact than it is an attitude moulded though many years of slavery and colonisation. In many instances there is no consideration of African knowledge and practices.

49. There is need for research to revisit our African past and engage knowledge and practices of our ancestors so that they have a role to play in enhancing Africa's food security. Such research should be multidisciplinary as our indigenous knowledge is not as fragmented and departmentalised as western knowledge systems are.

Dr. Ahmed Hassan: National Centre for Research, Khartoum, Sudan

50. Dr. Hassan gave some basic facts about Sudan and some characteristics of its diverse population (ethnicity, culture, language, etc) before focusing his presentation on indigenous food technology and the little attention it is getting from policy makers, researchers and the community. According to him, indigenous technologies in Sudan can be grouped into nine categories: Beverage; cereals; fish products; meat; fruit and vegetables; dairy products; legumes; roots; and miscellaneous products. He suggested certain key elements necessary for the development and promotion of these indigenous food technology. These are: making an inventory of IFT, ranking of IFT according to priority, raising awareness of both policy makers and Community.

51. Finally Dr. Hassan suggested that: (1) WIPO should include IFT as part of the patentable Traditional Knowledge; (2) ECA should help in the creation of some sort of a body or an arrangement which should, promote the certification of promising IFTs; (3) NGOs promoting IFTs should be encouraged since they work at the grass-roots; (4) Projects on IFTs presented to donors should be productive, sustainable and have income generating potential; and (5) Given the increasing importance of networking, there is a need for a web site on IFT in Africa.

Ms. Gaye, African Regional Centre for Technology (ARCT)

52. In her presentation, the representative of ARCT gave a detailed account of her organisation's involvement in the promotion of technological development in the region and in particular, food-processing technology. ARCT activities in the field of food processing include the establishment of pilot and demonstration units in several African Countries and the training of women's groups in food processing technologies.

53. Ms. Gaye said that the persisting hunger, malnutrition and undernourishment in Africa with all the known consequences have underlined explicitly the urgent need to intensify effort to promote food security as well as alleviate poverty, particularly in rural areas and through the promotion of the use of upgraded traditional enterprises in the food chain.

54. The ARCT has established Pilot and Demonstration Units for Food processing in several African Countries: Cameroon (fish processing), Ghana (cassava processing), Kenya (Maize mills), Nigeria (fish processing), Senegal (Biscuits made from local cereals, palm oil processing, fish processing), Zambia (Maize Sheller).

55. Ms. Gaye gave information on the "Agro-Food Enterprises" Project (West Africa), which was elaborated by the ARCT in close collaboration with the Environment and Natural Division of the International Development Research Centre (IDRC). The project was concerned with research activities aimed at using participatory research methodologies and interdisciplinary collaboration to determine the most important elements needed for small- and medium-scale agro-food enterprises to be economically and technically viable. The activities which were coordinated by the ARCT involved the participation of institutions in Benin, Ghana, Nigeria, and Senegal. The work involved determining the most viable types of small- and medium-scale agro-food enterprises which can be implemented in the sub-

region, determining the appropriate socio-economic and technical conditions necessary for the viable operation of small-and medium-scale agro-food enterprises using the cassava and fish processing as case studies, strengthening the policy makers, and relevant institutions in order to develop suitable support structures for enterprises.

56. Although primary food commodities exist in substantial quantities, development of viable small/medium scale agro-food enterprise in the West African sub-region still leave much to be desired. This situation has caused not only natural, human and technological resources to be under utilized – thereby depriving the population of better quality and increased quantities of food, but it has also reduced the creation of employment and income generation. This project sought to fill this lacuna by systematically and in an organized fashion undertaking activities aimed at the development, introduction and promotion of appropriate processes and technologies which should take into account a range of social, economic, cultural, institutional and technological factors.

57. The general objectives of the project are to promote environmentally benign small and medium scale agro-food enterprises, particularly those dealing with cassava and fish, in selected African countries with a view to enhancing their techno-economic development on a sustainable basis, valorizing their national resources and generating employment.

58. Using the facilities available at ARCT, IDRC and in the four collaborating institutions, Direction de l'Alimentation et de la Nutrition Appliquée, Benin (DANA), Food Research Institute, Ghana (FRI), Institut de Technologie Alimentaire, Senegal (ITA) and Nigerian Institute for Oceanography and Marine Research, Nigeria (NIOMR) data and information on a range of important agro-food processes and technologies have been assembled. These include processes and technologies related to: Banana/Plantain, Palm Fruit, Tomato, Millet and Sorghum, Fish, Groundnut, Cassava, Sheanut, Rice.

59. Those Agro-Food Technologies relevant to small/medium scale enterprises have been assessed on the economic importance of the product, food security aspects, techno-economic viability and marketability.

60. In conclusion, Ms. Gaye said that the main objectives of the project have been achieved, in particular, those related to: (1) the identification and documentation of indigenous and improved technologies for cassava and fish; (2) the strengthening of human resources (skills) for the improvement of food security in Africa; (3) the establishment of 34 agro-food enterprises managed by women in four countries and employing about 400 persons, and (4) the reinforcement of the financial capacity of the group through the use of improved indigenous technologies in ARCT's member countries through appropriate dissemination materials.

Mr. Atef Ghabrial, Organisation of African Unity (OAU)

61. The O.A.U Representative briefed the meeting on the newly established "African Union", which entered into force on 26 May 2001. He referred to Articles 13 and 14 of the Consecutive Act of the African Union. He said that in Article "13" the Executive Council of the Union shall coordinate and take decisions on policies in areas of common interest to the member States. The areas enumerated include under (c) Food, Agricultural and Animal Resources, Livestock production and Forestry. Moreover, in Article 14 of the Act,

a number of Specialized Technical Committees were to be established. The first one is the Committee on Rural Economy and Agricultural matters. He added that this showed the commitment of the African Leaders toward the area of Food Sufficiency as an important prerequisite for development. Indigenous food technology in one of the essential components for the purpose. The OAU/AU Secretariat would support any efforts in this direction. Finally, he distributed copies of the Act to all participants.

CONCLUSIONS AND RECOMMENDATIONS

62. Following the presentations, participants identified and discussed at length the major issues that emerged from the presentations.

63. In the process of the debates, they sought to answer the main questions raised by the Director of the Division in his opening statement. The summary of the conclusions and recommendations on these and other relevant issues is presented below:

CONCLUSIONS ON EMERGING ISSUES

64. The first question was how to identify, describe and record information on the best technologies that can be shared and exploited more broadly and provide greater benefits to Africa; how to encourage policy makers to pay greater attention to these technologies; which organization should be encouraged to take the lead in developing a comprehensive database and website on indigenous food technology?

65. Participants felt that there is a need to identify all the existing databases on indigenous technologies and knowledge and to know who owns or has them.

66. They underlined the importance of databases and suggested that they should be compiled at country, regional and continental levels to ease the sharing of the databases and other information between countries and professionals. The sharing of the information would avoid a duplication of efforts since a country or a professional interested in a technology which has been identified somewhere else would not have to go through the whole identification process all over again.

67. All media should be used to compliment the compilation of the databases to enhance the flow of information and allow researchers to publish their results. The internet is a powerful tool which could be used to collect, share and disseminate the information.

68. A method of judging and classifying a technology in the compilation of databases on indigenous food technologies is needed. To this effect, there is a need to identify the criteria for selecting a technology as a best practice. A criterion for choosing a technology as a best practice to be disseminated would be, for example, to select technologies that have the potential to improve the quality of the product or those that can increase the quantity of the product. The identification of technologies could be done through a survey as indicated in the paper by Prof. Sefa-Dedeh (p.4). In the paper it is suggested that field

surveys should include the profile of operators of these technologies, materials used, processes followed, characteristics of products and marketing and storage of traditional foods. The origin of the food product must also be clearly identified and indicated. However, there should not be a rush in looking and selecting so-called best technologies as there would be a risk of putting aside technologies which are potentially good.

69. A system needs to be put in place to select technologies so that they could be used or their products consumed all over the world as are soy sauce and tofu for example. These products were originally from oriental countries (China and Japan) but now are available and consumed in most countries in the world. The question then is how to push and sell these technologies so that they could become world class technologies. In this connection African technologies with potential should be identified.

70. Concerning the question as to which institution should take the lead in developing a comprehensive database and website on IFTs, ECA was urged to take this lead. In this connection, it was felt that the Commission should recognise other initiatives being implemented right now such as the World Bank best practices projects. All the existing initiatives should be linked so as to avoid unnecessary duplication of efforts would be avoided. In the existing initiatives, there is a journal on Indigenous Knowledge which is published by Centre for International Research and Advisory Network (CIRAN) at The Hague and which is also available on the internet. The ECA could draw on their experience and try to complement their initiative instead of duplicating it.

71. The second question was how to validate, test or assess selected technologies in "laboratories" and in different agro-climatic, socio-economic and cultural environments; how to make sure that these technologies and innovations bring benefits to those (individuals or local communities) who have developed them.

72. On this issue, participants felt that in order to ensure the relevance and applicability of indigenous technology, its development must be driven by the needs of the end user and should not be done in a vacuum. It is however pertinent to satisfy local needs before venturing into international markets.

73. Regarding the process of validation and testing of technologies, it is crucial to first describe the social and cultural variables involved in the technology before validating. A technology profile which identifies all variables and options, should then be carried out, making it possible to select the best available option to be subjected to validation.

74. The process requires a multidisciplinary approach which should involve all stakeholders including processors researchers and field workers and extension agents.

75. Regarding research work on indigenous food technology, this would be resource intensive requiring investment in research infrastructure such as laboratories and field testing equipment. It would be more efficient to either link up or contract out research work to competent institutions (national, sub-regional, and regional) or individuals. In the long term and depending on the felt need, the establishment of a regional centre for indigenous food technology research could be explored.

76. Research should be carried out using proven and accepted methodologies and procedures. Research activities and results should be well documented and should go through the certification process.

77. It is important to take into account agro-climatic, socio-economic and cultural environments in developing indigenous technologies.

78. Regarding the cultural aspects, barriers could be overcome if research activities are carried out in a participatory manner. If people are sensitised and are involved in the whole process right from the outset, then they would be in a better position to understand and appreciate the issues. Extension agents and development workers can play an important role in sensitisation and outreach activities.

79. On agro-climatic issues, a raw material used in producing a particular product in one country may not be readily available in another country with different agro-climatic conditions. In this regard, research could be geared towards investigating locally available raw materials that can be used to produce similar and acceptable products.

80. On socio-economic aspects, research and technological development could help link indigenous knowledge to scientific knowledge. Indigenous technology should assure the needs of the local people first in terms of acceptability and affordability before addressing the needs of international markets.

81. The development of indigenous technology should be demand driven and participatory involving all stakeholders and most importantly - end users.

82. Concerning the question on how to protect and remunerate the owners or the innovators of the technologies, the meeting noted that IFT is most often than not identified with a group of people or a community. It may be easy to identify an individual who holds the secret to some types of indigenous knowledge such as traditional hunters with the knowledge to conserve game meat or traditional healers with the secrets to medicinal herbs. But it is more difficult to determine the individual ownership of an indigenous food technology (IFT) because such knowledge has been passed from generation to generation within the community.

83. Once the individual or group ownership is determined, remuneration can be effected. Where there is an improvement or upgrading of the technology, this remuneration could be done according to agreed modalities taking into account knowledge, innovations and efforts of traditional operators and the scientists responsible for the improvement.

84. Knowledge or IFT which is individually owned can be easily patented but patenting IFTs with group ownership could be difficult.

85. Patenting is a long, expensive and complex process. Discussions on related issues go beyond the expertise of the current meeting. The World International Property Organization (WIPO) and African Regional Industrial Property Organization (ARIPO) and Organisation Africaine de la Propriété Intellectuel (OAPI) among other organisations can provide this expertise.

86. Africa must not, nevertheless, continue to allow its indigenous knowledge to be freely taken away and patented by other nationals. An awareness raising campaign is needed. Of importance is the proper documentation of Africa's IFTs, the sensitisation of African government, and the inclusion of women operators in the discussions relating to remuneration and patenting.

87. The issue of patenting as well as other legal issues should be discussed within countries. Some people could exploit information for their own benefits without taking into account those who collected the information and those who generated the technology

88. On the question of how to exploit, transfer, commercialise or 'industrialise' the technologies, or how to move the technologies from the 'familial', 'artisanal' or 'anthropological' domain into the realm of business and micro or small business enterprises, the meeting emphasized the need for R&D to be undertaken to enhance Indigenous Technology Knowledge (ITK) to a level that it can be patented.

89. The meeting recognized that small entrepreneurs need assistance in financing and management at community level and felt that they should go into partnerships (micro-enterprise or co-operative) with commodities already in existence in order to take advantage of economies of scale

RECOMMENDATIONS

90. The meeting recommended that:

91. A consultative body for indigenous food technology advancement be created with ECA as the main player and with various experts assisting ECA in the co-ordination of information on IFT in Africa. To put this initiative into action, there is a need to identify existing IFTs and put them in a database so that new additions could be easily recognised.

92. Countries where policies on IFT do not exist should adopt relevant policies and make institutional arrangements to co-ordinate the initiatives at the national level. In countries where IFT policies already exist, they should be co-ordinated and harmonised at sub-regional and regional levels.

93. As part of database preparation, a website needs to be created which should include relevant IFT information. This is necessary for creating awareness and networking among countries. Such information should include information on patents so as to increase awareness. The website should be created at institutional and national levels and harmonised and co-ordinated at sub-regional and regional levels for advocacy and awareness raising.

94. A Joint ECA/OAU/ADB Secretariat should play a major role in the awareness raising campaign at the regional level.

95. Institutions already working in this area (IFT) need to be supported

96. ECA needs to bring to the attention of governments the importance of IFT for food security

97. Recognise the importance of patenting by building on the work of WIPO, and ARIPO and OAPI. In addition, urge African countries to work with WIPO to expand the provisions of article 27(3)b to include African Indigenous Knowledge among patentable subject matters.

98. Countries should enact legislation to protect their indigenous knowledge.

99. Countries should prepare national inventories of indigenous food technologies.

100. Fairs should be organised to bring together operators of indigenous food technologies to increase local awareness and share experiences.

101. Nations should acknowledge owners of indigenous food technologies.

102. ECA should establish a follow-up committee to see to the outcome of this ad-hoc expert group meeting on IFT.

103. Marketing issue in the development of IFT should not be overlooked.

104. It is important to include in the national curriculum program issues relating to indigenous knowledge

105. ECA should produce IFT awareness programs using appropriate media especially those related to locally produced and nutritionally superior foods.

106. Policy-makers should be aware of the contribution of IFT not only to enhance food security but also to reduce rural poverty and improve the quality of life. It is only if they appreciate the contribution of IFTs that policy makers will play greater attention to these technologies.

D. Closure of the Meeting (Agenda item 4)

106. The main conclusions and recommendations were presented by the rapporteur. These were discussed and approved. Mr. Josué Dioné, the Director of FSSDD was then called to close the meeting.

107. In his closing remarks, he thanked all participants for their contribution to the complex issues related to the role of indigenous food technologies in the achievement of food security in Africa. He said that he was very delighted with the meeting and that he had learned a lot from the discussions. He stated that he was convinced of the importance of indigenous technology in the development of the continent and hoped that policy-makers would pay more attention to these technologies in the future.

108. The Director expressed his satisfaction regarding the results of the meeting. He observed that all its objectives had been achieved. He said that the presentations and the discussions were of very high quality and that ECA had benefited a lot from the expertise and experiences of the participants. He said that ECA was now in a better position to serve Africa better. He added that he would seriously consider the recommendations of the meeting when preparing the programme of work of the next biennium.

109. The Director thanked the chairman and the rapporteur for their excellent work and all experts for participating actively in the debates. He expressed his gratitude and appreciation to all participants for giving their precious time for the development of the region and he wished them a safe journey home.

110. In response, the chairman thanked the ECA and the meeting for giving him and his rapporteur the opportunity to direct the affairs of the meeting and said that the meeting would not have been a success if not for the support of all participants. He hoped that the interactions which they the experts have begun on the subject of indigenous technology will continue out side the meeting .He also hoped that the Division would keep them well informed on the implementation of the recommendations of the meeting. He then wished all his colleagues a safe and pleasant journey back home.

Annex I

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