IDRC-016e

Consumer Food Utilization in the Semi-Arid Tropics of Africa

Report of an interdisciplinary workshop
Zaria, Nigeria, 30 April - 4 May 1973

INTERNATIONAL DEVELOPMENT RESEARCH CENTRE
CENTRE DE RECHERCHES POUR LE DÉVELOPPEMENT INTERNATIONAL

Ottawa, Canada

1973

Abstract

A workshop was held in Zaria, Nigeria, on consumer food utilization in the semi-arid tropics of Africa. Papers were presented by participating countries on problems associated with aridity, crop production, marketing, processing, and consumption, with a view to developing a systematic approach to food utilization. Research has been focused on increasing the production and utilization of crops grown in the semi-arid regions to achieve self-sufficiency and improve the nutritional status of the population. Education and production planning are necessary to modify food consumption patterns. Much of the food production, marketing, and processing in Africa is done by women on a small scale. Modernization of these systems is desirable and inevitable but consideration must be given to the social and nutritional implications of these changes. Additional agricultural and credit facilities should be extended to women to encourage their enterprises. Participants called for the preparation of a catalog on the use of various crops for the benefit of researchers. Recommendations were made for further research on problems of food processing, and the development of a methodology to identify consumer food preferences.

Résumé

Un groupe de travail sur l'utilisation des produits alimentaires par les consommateurs des régions tropicales semi-arides d'Afrique s'est réuni à Zaria, au Nigéria. L'objectif profond des pays participants était la mise au point d'une méthode systématique d'étude de ce problème, et ils ont présenté à cette fin des textes traitant de l'aridité, des productions végétales, du marketing, de la transformation et de la consommation. Les recherches se sont concentrées sur l'augmentation des productions et sur l'utilisation des produits récoltés dans les régions semi-arides; elles ont pour but de permettre aux populations d'assurer l'auto-satisfaction de leurs besoins et d'améliorer la valeur nutritionnelle de leur alimentation. La modification des habitudes de la consommation alimentaire exige une planification de l'éducation et de la production. Bien que travaillant sur une petite échelle, ce sont les femmes qui, en Afrique, exerçent une grande partie des activités de production, de marketing et de transformation des denrées alimentaires. La modernisation de ces systèmes est souhaitable et inévitable, mais il faut veiller de près aux implications sociales et nutritionnelles qu'entraînent ces changements. Que ce soit sur le plan de l'agriculture ou du crédit, les femmes doivent pouvoir elles aussi bénéficier de moyens leur permettant d'améliorer leurs entreprises. Les participants ont manifesté le désir de voir rédiger au profit des chercheurs un catalogue des diverses utilisations des produits récoltés. Ils ont également demandé des recherches complémentaires sur les problèmes de transformation de ces produits ainsi que la mise au point d'une méthodologie de détermination des préférences alimentaires des consommateurs.

UDC: 664(6)

Head Office: Box 8500, Ottawa, Canada. K1G 3H9
Microfiche Edition $1

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Contents

THE Interdisciplinary Workshop on Consumer Food Utilization in the Semi-Arid Tropics of Africa was organized to consider the impact of changing food consumption patterns on food production and marketing systems in the semi-arid regions. The Institute for Agricultural Research of Ahmadu Bello University hosted the workshop, with support from the International Development Research Centre. The Institute has long been involved in agricultural research in the semi-arid regions of Nigeria.

Scientists at the workshop represented two groups: those concerned with crop production, storage, processing and marketing, and those concerned with the consumer sciences of food choice, food preparation, and nutritional value (see Appendix 1 for a list of participants). Problems of participating countries in the areas of consumption, production, processing, and marketing, were discussed in an effort to come up with a systematic approach to food utilization based on nutrition, economics, aesthetic values, and production technology. Crops of particular interest were sorghum, millet, groundnuts, cowpeas, and fruits and vegetables of the semi-arid tropics. Consumer preferences and their effects on food production and marketing were also discussed.

The full text of the 15 papers presented at the workshop is included on microfiche in a pocket on the inside back cover of this report. Minor changes have been made in spelling and grammar but the papers remain largely unedited.

Food Consumption

Changing Patterns

For millions of people in many parts of the world, the change most desired in food consumption is a reliable and adequate supply of the traditional diet. In all parts of Africa food consumption is dominated by the starchy staples. During drought seasons calorie intake often drops considerably, and protein deficiency is even more marked. The potential for discovery of new crops is low; future improvements in crop production and, hence, consumption, will probably be based on detailed knowledge of the agronomic requirements of crops and the resources of the region.

Historically, the greatest changes in diet have been effected through the forces of poverty, affluence, and urbanization. Urbanites who once consumed large quantities of cereals as rural workers have a problem maintaining a high protein intake on the same diet, because of their reduced calorie needs. Quality and quantity of staples consumed are affected by income, demography, geography, food preservation, consumer preference, and sociological factors such as taboos, and ignorance of nutrition. In addition, authorities are always able to control production, trade, subsidies, and taxes, thereby altering food consumption patterns.

At the household level, education is an important factor in dietary patterns, influencing the choice and preparation of foods. Housewives need some guidance with old methods

of decision-making, habits in shopping, and meal management. The workshop members recommended that IDRC support home economics departments who wish to study these habits and effect improvements in patterns of food choice, particularly in households changing their lifestyle.

Food Consumption Studies

In Africa, the methods developed by the FAO to study food consumption have been used successfully to determine individual food intake by studying the family unit. A sample of families is selected and their food consumption is recorded in questionnaires over a number of days. The results are then analyzed to obtain a measurement of food intake per person per day. Nutritional standards have been established for individuals and the results of the studies are compared against these standards.

The Ethiopian Nutrition Institute has done studies in most regions of the country to identify local nutritional deficiencies. Some attempts were made to streamline the FAO methodology for these studies. Last year statistical analysts proposed a 2-day survey of families' consumption to replace the 7-day record.

Nutritional studies are time-consuming and expensive but there seems to be no other method to obtain information on the nutritional status of individuals. In traditional societies the time and cost required to complete a food consumption study is worthwhile, as food patterns are considered slow to change and the information can be useful for a long time. This information can be valuable to modify agriculture production policies, to establish criteria for education and training programs, and to diagnose dietary deficiencies within communities.

Food Production and Consumption Planning

Recommendations were made for improvements in education, food production, and marketing. Increased production is necessary to improve the nutritional status of individuals

and to meet increased demand. Governments must encourage subsistence crop farming for a growing population, by making it as profitable as export crop farming. Home economists must help set production targets that will also improve nutrition. Improvements in food marketing and processing will have an impact on food availability and levels of consumption. New processing methods can help to eliminate waste and loss of nutrients.

Food Production and Marketing

Women in Agriculture

Women in Africa continue to assume major responsibility for food production. Governments are gradually recognizing this and allowing women access to the agricultural services and credit facilities they need to develop modern agriculture. In Kenya, some women have formed cooperatives and taken advantage of these facilities to obtain credit and marketing services.

In other areas of Africa the picture is not so bright. Attention has been given to applied nutrition programs to improve local subsistence food production. In Lesotho, poultry and vegetable projects have had considerable success, encouraged by government agricultural policies and protected markets. The same type of project in Swaziland has suffered as a result of the dumping of agricultural products from South Africa. Under these circumstances, when poultry production is not protected, handicrafts offer women a better income. The issue of stabilizing food prices and improving the nutritional status of the community still needs to be resolved.

A number of projects to improve nutrition in Zambia were described. These included the groundnut and soybean campaign, the Nutritional Rehabilitation Village, the Female Extension Service, the Young Farmers' Clubs, school feeding programs, and the establishment of a permanent Food and Nutrition Commission. International aid programs have helped proliferate these projects, drawing

heavily on the attention of the small number of professional women in Africa. This has fragmented the time available to them and many basic issues of concern to African women have been neglected. The members of the workshop felt that the dual role of women has not been given sufficient thought or support. More attention should be given to labour-saving devices in the home. Enterprises identified and undertaken by African women need to be supported and encouraged.

Food Crop Production

FAO reports that an increase of 80% in grain legume production is necessary to meet demand. Increased production and consumption of soybeans, haricot beans, pigeon peas, and cowpeas can improve daily protein intake.

The two main cereal crops, sorghum and millet, and the two legume crops, chick pea and pigeon pea, came under discussion. These crops are widely grown in the semi-arid tropics and are being examined in the research program of the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT).

Sorghum Sorghum was considered most important for its potential as a drought-resistant cereal crop. Better crop varieties could result in better human nutrition and higher yields. Hyderabad, India, will be the centre for the network of research within the semi-arid regions and the first crop year began at ICRISAT in 1973. The research centres in Africa, representing various ecological zones within the network, will include: Alamaya, Ethiopia; Serre, Uganda; Samaru, Nigeria; and Bambey, Senegal. It was recommended that the members of the workshop maintain contact with ICRISAT and examine its future activities.

Home economists should also follow up on the development of new processing methods to increase the utility of the protein in sorghum. The bitter substances in sorghum, which belong to the group of tannins, make complexes with the protein molecules when milled; much of the protein in the grain then becomes unavailable and cannot be digested. If the outer grain layers containing the tannins can be removed before grinding, the protein in the endosperm of the grain is available in the diet.

Research is also being done on intercropping with sorghum to develop plant types which match well. This may be an effective method of pest and weed control; an additional advantage of intercropping would be the higher nutritional value of the harvest. However, the value of this practice is restricted to small-scale farming since crops must be harvested by hand.

Cowpeas Consumer preference must be considered in the application of breeding techniques to varieties of the cowpea. Qualities of cowpea such as cost, cooking time, cotyledon hardness, binding qualities, ease of seed coat removal, ability to incorporate air, colouring, and taste were identified as important to the consumer. High yield may have to be sacrificed for quality in the locally-preferred varieties. Improvements will result from the development of upright, day-length neutral varieties with their pods held above the leaf canopy; the seeds should be medium in size, white in colour, and have a rough seed coat to meet consumer preference in Nigeria. The yield of preferred varieties is low, and participants expressed concern over the period of 10 years that an improved breeding program would take. Closer links with contemporary legume breeders in other institutions should be maintained to ensure a greater impact on the improvement program.

Two major problems emerged on the subject of consumer preference. A reliable method to quantify and qualify the characteristics preferred by the consumer is needed to provide useful information to crop breeders in the grain legume improvement programs. Further, home economists could assist crop breeders with a collection of information on the domestic utility of the crop in areas where crop trials are being conducted. This feedback would be useful to the plant breeder and extension worker. Where cowpeas are not

being used, but have a good production potential, recipes from other areas should be collected and evaluated by home economists for local use. It was recommended that IDRC support: a) the development of a reliable methodology for consumer preference studies, and b) the gathering of information about preparation of cowpea products, particularly household recipes and processing methods, and equipment used in different regions of Africa. The information should be available in a catalog which could be used by all scientists working with the production and consumption of cowpeas.

Vegetables Crop rotation and protection, improved fertilization and cultivation methods, and expanded education programs were mentioned as important factors in increasing production of vegetables and improving their nutritive value. Low vegetable consumption is a problem in semi-arid regions and the following suggestions were made to improve the problem of vegetable shortage during the dry season in drought areas:

- the maintenance of semi-cultivated trees to supply edible leaves and legumes most of the year;
- processing of vegetable leaves and tomatoes in times of abundance, either by drying or pureeing;
- inter-trading betweeen the tropical zone and the arid zone (south to north), using refrigerated vans to exchange produce and livestock products. People in rural areas would be encouraged to make better use of household water and practice intercropping in household gardens.

Tomatoes are extremely popular in Africa both for the fresh market and for processing, and the semi-arid regions are best suited to economic yields. A number of agronomic practices are being used and tested to raise the level of production. In West Africa the demand for processed tomato puree is esti-

mated to be 1000 tons/million population. The processing of tomatoes could probably be done locally; to avoid the high cost of establishing processing plants and using foreign currency to import processed tomatoes, certain processes associated with laminated packs have been developed at the intermediate level of industry.

Marketing

A remarkable trading organization has been developed by the market women in West Africa. Marketing came naturally as a secondary occupation to women who already grew food crops and sold what was not used in the household. They turned to trading to build up a measure of security for themselves and their children. The social system helped the organization of this network, and polygamy allowed wives to be independent and mobile. The capital required for food marketing was small, facilitating entry into business. Today, a woman will select a commodity with which she feels comfortable and will specialize in this trade. In some cases market organization is quite complex. Traders of a specific commodity may form an association, with a "commodity queen" as leader. She purchases large quantities of a product and distributes it to the retailers, sometimes on credit. Comments were made on the dedication and determination with which the trader faces her task of providing foods to the consumer in even the most remote villages.

Modernization of the food market is inevitable to improve sanitation, packaging, and handling, but it was felt that this should be done with the women in the system. Concern was expressed about the future development of food marketing. The modern, educated girl may not be as successful as her illiterate mother. Governments have some responsibility to provide opportunities for educated girls to get into the marketing system. A government-controlled marketing system does not seem to be the answer when an efficient system has been built up by the women in West Africa.

Food Processing

Both rural and urban women in the semi-arid regions engage in food processing for commercial gain. At present, it is a small-scale, low-technology industry with a strong orientation toward the consumer. Consumption of prepared food is high. The kinds of foods processed in a particular area depend on consumer preference and accessibility of raw materials.

There are substantial employment opportunities for women in food processing; in a study carried out near Zaria it was found that 78% of the rural women were engaged in this activity. The economic impact of this system in providing employment for women and low-cost processing services to the community, is only now becoming obvious. The structure of employment in this small-scale food processing industry has been extremely successful in the rural community. It requires little investment; often the equipment available in the home is enough to open up a business. Women work from the home, sometimes using children to distribute the product. This low capital, socially satisfying enterprise has certain advantages over large-scale food processing industries. It is important to point out the advantages and disadvantages of both

types of industry in a rural community such as northern Nigeria.

Small-Scale Industry

Advantages

- Provides rural employment
- Supplements the small agricultural income of rural households
- A variety of processed products are readily available to the consumer
- Provides rural women with personal security
- Overcomes the social-cultural constraints on women's employment, such as that imposed by Kulle (Islamic seclusion of women)
- Requires small capital investment

Disadvantages

- Provides small per capita earnings to the processor
- Smallness of the firm makes it susceptible to failure

Large-Scale Industry

Advantages

- Large quantities of material can be processed
- Stimulates the production of raw materials
- May lead to external trade
- Provides higher per capita earnings to those employed by the industry

Disadvantages

- Few people are employed
- Large industry requires urban facilities
- Creates urban employment
- Production of raw materials is often not sufficient to supply both the industry and the rural market
- Products are more expensive than rural products; thus they are urban-oriented

There is an important role for women in the present food processing industry; however, better equipment for food processing,

and education in managerial skills were recommended.

There was little consensus on the various methods used to prepare foods in the areas represented at the meeting. Practices of food preparation in Africa differ so markedly that there was little common ground for discussion. It was recommended that IDRC support the collection and documentation of the information available in different areas to provide a basis for understanding grain use in Africa.

Current Concerns in Africa

The problems of self-sufficiency and full utilization of foods in Africa are not unique to the semi-arid regions, but workshop participants emphasized the urgency of the situation in these areas, and the severity of seasonal food shortages. There were a number of common approaches to food utilization in semi-arid regions, and participant countries expressed concern for the following problems:

- the need to increase the use of local crops and foodstuffs to overcome regional disparities and achieve self-sufficiency;
- the lack of sufficient knowledge of consumer preferences to hasten policy decisions for development of local food processing industries;
- the need for a communications infrastructure to expand the opportunities for regional utilization of agricultural labour, transportation of goods, and expanded markets;
- the influence of social and political factors which demand the export of food crops at the expense of local dietary needs. A number of participants felt the managerial and technological expertise developed in Africa to export agricultural products should be used to produce and process local food crops to achieve self-sufficiency.

These problems are being given considerable attention in several countries by planning commissions composed of agriculturalists, economists, and nutritionists. In Nigeria, the federal government[1] is committed to providing cheap and adequate food for everyone; a specific target has been set to raise the per capita daily calorie intake from 2000 to 2400 before 1985.

Recommendations

It is obvious that consumption patterns, food production, marketing, and processing are all closely interrelated. In the application of new technology to the production, marketing, and processing of food crops in Africa, it is necessary to consider the merits of existing practices, nutritional improvements, and consumer preferences, in addition to economic advantage. The following recommendations were made as part of a total approach to food utilization in the semi-arid tropics of Africa:

1 IDRC should prepare a catalog of existing information on the nature and extent of use of sorghum, millet, chick peas, pigeon peas, and cowpeas. Information of particular interest includes:
   a) the characteristics of the crops presently preferred by consumers in Africa;
   b) the household recipes most widely used;
   c) the recipes most common among native commercial food processors; and
   d) the processing equipment used by native commercial food processors.

   This information should be available to the home economist, the consumer and market economist, the food scientist, and the crop scientist to discourage research in isolation and encourage improvements in crop utilization systems.

2 IDRC should assist African scientists in the development of research methodology to identify consumer food preferences.

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[1]A Quantitative Analysis of Food Requirements, Supplies and Demands in Nigeria, 1968–1985, Federal Department of Agriculture.

3 IDRC should support research on local problems of food processing identified and proposed by local institutioos in Africa. First priority should be given to the commercial processing of the cowpea (*Vigna sinensis*) for preferred household food products.

4 IDRC should support research into effective methods of introducing new patterns of food selection when proposed by local home economics extension agencies, and associated with national food utilization policies.

5 Future meetings should consider: a) household labour-saving devices for the processing and preparation of cereals and grain legumes, and b) losses in nutritive values of foods normally cooked and served together in the semi-arid regions of Africa.

Certain suggestions were made concerning dissemination of the results of the workshop. The decision of IDRC to publish this report of the proceedings, including the complete papers presented in microfiche form, will more than satisfy the intended coverage and distribution contained in the original recommendations.

Appendix 1

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Appendix 2

LIST OF PAPERS PRESENTED

(Microfiche included in pocket on page 3 of cover)

1 Changing food consumption patterns in the semi-arid regions of Africa: agricultural implications, by J. A. Fewster

2 Centuries of changing food consumption patterns in African communities, by E. O. Idusogie

3 Conducting food consumption studies to develop applied nutrition programmes, by Abeba Gobezie

4 Socio-economic factors governing retail food marketing in West Africa: the case of Ghana, by Florence A. Sai

5 The changing patterns of African diets in relation to income, by Olatunyi Anthonio and T. O. Adeyokunnu

6 Factors other than income influencing food consumption patterns in the semi-arid zones of Nigeria, by C. E. Williams

7 Legume breeding — scientific advances influencing production and usage of grain legumes, by Ono I. Leleji

8 Recent developments in sorghum for the semi-arid regions, by H. Doggett

9 Production, marketing and processing of tomatoes in the semi-arid regions, by J. G. Quinn and K. McLean

10 Household and commercial vegetable production as a means to improve nutrition in the semi-arid regions of the tropics, by J. O. Uzo

11 Consumer preference in grain quality of the cowpea, by M. Adeleye Akinpelu

12 The economics of consumer-oriented food processing technology in northern Nigeria, by E. B. Simmons

13 Processing grain products for the African market, by Ester Ocloo

14 Importance and uses of sorghum in Nigeria, by A. O. Abifarin

15 Food production and consumption planning, by Abdou A. B. N'jie