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WOMEN ENTREPRENEURS IN THE FOOD PROCESSING INDUSTRY

by

Esther Ocloo
Sustainable End of Hunger Foundation

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SUSTAINABLE END OF HUNGER FOUNDATION

July 13, 1993

Dr. V.W. Campbell
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A U S T R I A

Dear Dr. Campbell

Please find attached according to the terms of reference the following:

1) Background information on the existing institutional support to food processing activities.

2) Involvement of women in the food processing sector.

3) Demand for processed food and the availability of raw materials.

4) The extent to which equipment relevant for small-scale producers is readily available.

5) A modification of the existing training manual on food processing.

Additional information has been provided under the sections 1 to 4.

I apologise for the delay which was due to my not receiving the UNIDO manual early.

Please do not hesitate to ask for any clarification or make any comments.

Sincerely yours,

DR (MRS.) ESTHER OCLOO — Consultant

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WOMEN ENTREPRENEURS IN THE FOOD PROCESSING INDUSTRY

1. BACKGROUND INFORMATION ON EXISTING INSTITUTIONAL SUPPORT TO FOOD PROCESSING ACTIVITIES

Before the independence of Ghana in 1957, there were only two food processing companies in the formal sector but many small ones in the informal sector. These two companies engaged in baking and the making of fruit juices and preserves e.g. orange marmalade and pineapple jam. There were no institutions available then to support and promote these ventures.

From 1957 to 1969, Ghana embarked on an intensive industrialization policy with an emphasis on import substitution. This made it possible to use imported raw materials and machinery to produce domestically consumer goods which were then being imported. Within this context, food processing activities in the formal sector were encouraged. Government started to support food processing industries with much emphasis on the establishment of food processing factories and research institutions.

The food factories set up processed vegetables, meat, fruits, oil and grains. Some examples of these were the Takoradi Flour Mills, Tema Food Complex Corporation, Bolgatanga Meat Factory, UAC Pig Processing, Premium Meat Packers and the Asutsuare and Komenda Sugar factories. These factories were either fully state-owned or of Government and foreign joint ventures.

To support the activities of the Food Processing Factories, Government established the Food Research Institute (FRI) and the Industrial Research Institute (IRI).

Since 1977, and with the food crises that occurred in 1983, there has been a re-definition of the functions of many of the supporting institutions, as well as, the establishment of new ones, both government and non governmental, to enhance the activities of not only large scale industries but also the numerous small scale/cottage industries found in the informal sector. The institutional support being provided include research; development and transfer of technologies; provision of a conducive environment to promote food processing activities and organizing women to take advantage of new and improved technologies.

In the field of **Research**, two major institutions have been responsible for research in the food sector. Under the Council for Scientific and Industrial Research (CSIR) falls the Food Research Institute (FRI) and the Industrial Research

Institute (IRI).

The FRI carries out research into food types and related products looking mainly at problems of food processing, preservation, storage, marketing and distribution. The Institute develops new products suitable for industrial manufacture and provides advice and services in the area of food processing and food quality control. It has a consultancy programme for private, government and international agencies in areas like meat technology, fats and oils, cereals technology, cassava processing, animal feed manufacture and formulation of weaning foods. It also offers training facilities to promote food processing skills for interested people. The Institute has an engineering and maintenance workshop and test kitchen; processing laboratories for chemistry, microbiology, nutrition and biochemistry and; a library. Research activities are disseminated through news letters, technical reports, seminars, radio and television discussions (UNDP/TCC, 1990).

The function of the **Industrial Research Institute** is to conduct research that will enhance the efficiency of local industries including food industries by, (i) developing and testing the suitability of new products and equipment, (ii) improving existing technologies, and (iii) providing solutions to technical problems encountered.

The country's three main **Universities** are also very much involved in research. The University of Ghana, University of Science and Technology, and Cape Coast University, are involved in various research programmes through their Departments of Agricultural Engineering, Chemical Engineering, Food Science, Biochemistry, and other areas related to food processing (UNDP/TCC, 1990).

Development and Transfer of Technologies: The Technology Consultancy Center of the University of Science and Technology (TCC), the Intermediate Technology Transfer Units (ITTU's) and the Ghana Regional Appropriate Technology and Industrial Services Project (GRATIS) are responsible for the development and transfer of technologies appropriate to local production activities.

TCC was established in January 1972, to make available the experience and resources of the University to promote industrial development in Ghana. TCC has over the years evolved into an agency which develops appropriate technologies for small scale entrepreneurs. TCC established the Intermediate Technology Transfer Units (ITTU's) in various regions in order to make their services locally available to the local people.

The Ghana Regional Appropriate Technology and Industrial Service projects (GRATIS) are located in five centers in the country, namely, - Tema, Cape Coast, Ho Tamale and Kumasi, and are responsible for developing and disseminating

technologies to potential users (UNDP/TCC, 1990).

Through the assistance of the above agencies, equipment used by women have been improved upon. Some of the equipment are oil presses for extracting groundnut oil, palm oil and coconut oil; mills for milling dried pepper, cassava and legumes; graters, roasting pans for gari processing and improved stoves for fish smoking. In addition to the development of equipment, TCC, ITTU and GRATIS also train interested people in food processing.

Some other agencies providing technical support to small scale entrepreneurs are the National Board for Small Scale Industries and the Department of Rural and Cottage Industries. The Women Farmers' Division of the Ministry of Agriculture is also helping to teach women improved methods of food production, processing, storage and utilization.

A private Consultancy Company, Small Business Development Consultants, trains women in business management and food preservation. The last of the main institutions which help women food processors is Women World Banking. It helps in training, the acquisition of credit and technical assistance.

Provision of Credit Facilities: Commercial banks such as the Agricultural Development Bank and the National Investment Bank support the food sector by providing credit facilities to farmers to procure farm inputs and food processors to buy equipment. The National Board for Small Scale Industries and the Women in Development Programme under the Ministry of Local Government, provide financial support under the Programme of Action to Mitigate the Social Cost of Adjustment policies of the government (PAMSCAD). NGOs such as Women's World Banking also assist women to acquire credit.

Mobilizing and Organising Women to use New and Improved Technologies: There are a number of agencies, government and non-governmental, involved in organizing women to enable them acquire and use new technologies. Foremost amongst these organizations is the National Council on Women and Development (NCWD) which was set up in 1975 as the national machinery to co-ordinate and disseminate resources to avail women of better agricultural practices and food processing practices. It liases with government, UN agencies and NGOs regarding programmes and opportunities for women. The Council also monitors the full integration of women in the development process at all levels (UNDP/TCC, 1990).

The 31st December Women's Movement which was set up in 1983 to assist rural women who work on the farm has provided a lot of support in organizing the rural people in this direction. The movement organizes women into co-operatives to provide labour to the community and carries out domestic responsibilities in food

production, processing, storage and marketing. They also initiate programmes to enhance integration of food production, provision of credit schemes through formation of co-operatives and promotion of income generating activities and local methods of preserving food (UNDP/TCC, 1990).

The Nutrition Division of the Ministry of Health with the support of UNICEF has engaged in community-based weaning food production in order to prevent malnutrition among infants and children especially in rural communities. The Women Farmers Division of the Ministry of Agriculture mentioned above, also plays a significant role in mobilizing women in food production (Owusu, 1989).

Provision of a Conducive Environment to the Food Processing Sector: Government has set up a number of agencies to help the food processing sector thrive. Among these are (i) the Ministry of Industry, Science and Technology[1] which draws up policies affecting industrial activities; (ii) the Ghana Investment Center which specifies areas for activating the agricultural agro-industry sector (see PNDCL 116 of 1985): (iii) the Ministry of Finance and Economic Planning which draws the monetary and fiscal policies and (iv) the National Board for Small Scale industries and the Department of Rural and Cottage Industries which co-ordinates and directs development of small scale industries including food processing, in Ghana.

Factors impeding institutional support

While there are numerous institutions supporting the food processing sector, they are beset with lots of problems which make their effectiveness and impact less visible. Among these problems are:

1) Lack of resources for research: This includes inadequate financial support; non-availability of well equipped laboratories; equipment for testing and so on; there is also lack of research and development personnel. This includes people who will develop scientific findings for commercial purposes. At present innovations and research findings of the Food Research Institute for example, is not readily available for commercialization (UNDP/TCC, 1990).

2) Despite the importance of the Food processing sector to the economy of Ghana, none of the academic institutions in the country cater for the needs of food

[1] Since March 1993 this ministry has been separated into the Ministry of Industry and Trade and the Ministry of Science and Technology.

processing industries by relating academic programmes to the activities of these industries.

3) Financial set-ups in the country are not effective and supportive of food processing.

4) Even though the government has established a more liberal foreign exchange market, yet the small scale food processor is marginalized by the bigger and more affluent entrepreneurs because of high interest rates and also because of fluctuations in the foreign exchange markets. These have made local goods sometimes more expensive than imported ones of similar make. For instance, the availability of large quantities of imported refined vegetable oil contributed to a glut of palm oil on the market in 1989 and 1990. The local producer therefore has no incentive to produce to compete with imported products of similar kind which are cheaper in price and higher in quality.

Ghana's current trade policy is geared towards the reduction of controls resulting in trade liberalization which has placed local companies in an unfair competition, especially the food processing sector. Trade liberalization has led to a reduction in domestic production of manufactured goods and therefore to reduced utilization of locally produced raw materials (UNDP/TCC, 1990)

5) Most supporting agencies in the food processing sector are not co-ordinated therefore there is often the tendency of duplication and lack of integrated efforts in supporting activities in this sector.

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(1) Owusu, W.B (1989) Field Experiences and Reports from Organisations involved in Food Technology Development and Extension: In proceedings of a workshop on Harnessing Traditional Food Technology for Development.

(2) UNDP/TCC (1990) Report on Food Processing sector. UNDP/TCC Doc. 15 Technology Transfer Center (CSIR)

2. INVOLVEMENT OF WOMEN

In Ghana, agriculture constitutes nearly 80% of the principal source of employment. The number of women participating in economic activities in this sector is very high. Women constitute the majority of farmers (approximately 75% (United Nations, 1991), and they do not only form majority of small growers, but they also process all the food that the small farmers grow including marine produce.

Food processing has for a long time now been the domain of women whether at the household level/informal sector or in the formal sector. Food processing contributes immensely to self employment amongst women. 82% of the total population of employed persons in the food manufacturing industry in Ghana are females who are self employed (Statistical Service, 1984).

Even though in most cases their educational levels and access to advanced technology is minimal, women in the food processing sector exhibit a high degree of ingenuity even in applying traditional technologies. A clearer understanding of women's involvement in the food processing sector can be seen by categorizing them into:

1. **Women in the Formal Sector:** Women entrepreneurs in this sector utilize a mix of technologies either imported or local e.g. hardware items/machinery/equipment such as grinders, separators, extractors, evaporators, expellers etc. A great deal of manual labour has been replaced by mechanized processing. Raw materials are acquired locally and or imported. Also in this category, critical concern for packaging, product design and presentation are important. The companies in this sector are often registered and as such observe government's industrial regulations.

Food processors in this sector have a more ready access to technical information and assistance. Their scale of operation is normally small to medium size and they have more access to financial support from banks compared to the informal sector which mainly comprises microenterprises. Products in this sector include: -

1) Gari[2] and allied products processing for domestic and export market.

2) Pepper powder and sauce for domestic and export market

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[2] Gari is derived from cassava, a very popular Ghanaian staple.

3) Groundnut paste for domestic and export market.

4) Jams, marmalade, fruit juices and canned cream of palm fruits both for internal or export market; processed edible oils and fats derived from palmnut, groundnut, coconut, sheanut and cotton seeds for domestic and export market.

Women's involvement in the formal food processing sector is very limited. In Africa only 6% of women are active in industry (United Nations, 1991). This situation might be due to the fact that such activities have to follow strict guidelines, adequate financial commitments, above average technologies, strict quality control and inspection, adherence to standards and substantial capital outlay. Most of these prerequisites require some level of education which majority of women do not have. Now that unemployment is on the increase this sector is a potential avenue for the young girls from secondary schools and female graduates from the universities. There is the need to encourage and equip these people with the know-how to enter this sector.

2. **The Informal Food Processing Sector:** This refers to the household or traditional village processing units which use locally manufactured equipment or indigenous methods of production. Their activities are small and simple to operate. This sector has for years been the preserve of women. Unlike the formal sector entrepreneurs do not follow any strict industrial guidelines. Women in this sector depend mainly on local sources for their raw materials. This is mainly in the form of agricultural produce from their own farm or produce bought from other farmers or market women. In the case of fish, women buy from their husbands or other fishermen.

In this sector, women use technologies handed down to them by their parents/relatives/ancestors. The methods used for processing are not standardized thus affecting quality. There is often minimal concern for product design, packaging and quality control. There is less vigorous monitoring by health inspectors therefore foods are in some situations processed and stored under poor hygienic conditions. The target consumers are locals consisting of people in the rural areas and urban centres.

Women in this sector do not have ready access to technical information and assistance and financial support from banks. Women in this informal sector can be divided into two groups. Those who (i) process food stuffs into products used for cooking, and (ii) those who process "ready to eat foods":

i) **Processing of food stuffs:** Included in this, are women involved in the following activities:

(1) Village level grain milling with small machines either for formation of maize

grits or maize flour and rice flour. In some cases pounding or grinding of cereal traditionally on stone slabs or in mortars is done where grinding mills are not available.

(2) Sun drying of meat, fish and vegetables.

(3) Grinding of pepper.

(4) Dehydration of vegetables, roots and tubers.

(5) Fish smoking utilizing the Kagan or chorkor smoker and salting of fish.

(6) Baking of bread utilizing traditional brick and clay ovens.

(7) Processing of cassava into gari utilizing the traditional technique.

(8) Oil extraction and processing

(9) Traditional fermentation techniques are also used especially to preserve and process certain kinds of food e.g. tubers and roots, cereals especially after they have undergone secondary processing to produce corn or cassava dough.

(10) Frying and roasting are other methods used traditionally.

The main characteristic of this sector is that in view of the simple processing methods used, the processed foods have much shorter shelf life.

ii) **"Ready to eat Foods"**: Women in this category process ready to eat foods from their homes, by the streets (street foods), traditional restaurants (known as "chop bars"), canteens, or in the markets. Foods sold include main dishes such as kenkey and fried fish; gari/fried plantain and beans; various kinds of soups and stews which accompany staple foods such as banku, fufu, yam and rice. Light foods such as tea, coffee, corn porridge and bread/ bean cakes[3] are served for breakfast and; groundnut/coconut cakes, roasted plantain and groundnut, boiled corn etc. are also sold as snacks.

The preparation and sale of "ready to eat foods" is more prevalent in the cities and urban centres. These foods play very important roles in feeding the working class, students/school children and market women. Chop bars for example are located around building construction sites as well as locations of a high

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[3] Commonly known as Akara, Kosei, Akla or Akara.

concentration of industrial workers, public servants and students. Most of the women who run these bars and sell by the road side or market are often illiterate.

Workers canteens/cafeterias and restaurants are the more organised of the food services. These are fairly modern with advanced facilities and organised by ladies who have had some training in catering. They provide variety and choice in food and cater for customers from the middle class and above, and foreigners. Some are also designed specifically for a certain sector of the population, such as student cafeterias. Others also sign contracts with companies to provide food to staff at subsidized prices.

In the rural areas selling cooked foods is often an alternative to processing food stuffs into products used for cooking. In these areas some women consider the selling of cooked foods unprofitable because it requires extremely long hours and early rising and brings little profit compared to processed foods such as gari. However some women are forced to engage in selling cooked foods because they do not have the means for processing food stuff into products used for cooking. For example in Antoa, a village in the Ashanti Region of Ghana, women said the lack of capital to purchase cassava forced them to sell cooked food instead of expanding their traditional gari production **(ILO/NCWD, 1987).**

It must be noted that processors in the informal sector exhibit a high sense of entreprenureship but because majority are illiterate, they do not understand and appreciate the need to properly apply the principles of hygiene, assess product quality and manage their businesses for optimum profit. These women need to be trained in order to provide good service to the consumer and also realize optimum profit. The young graduates from secondary/commercial schools and universities need to be trained to run food processing industries as well. This will not only help to create jobs for so many of them but it will help women to explore the wide and varied fields of food processing industries which require the application of science.

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3. THE DEMAND FOR PROCESSED FOOD AND AVAILABILITY OF RAW MATERIALS

The Demand For Processed Foods

The Demand For Processed Foods[4] in Ghana basically depend on its availability, the taste or flavour of the food when prepared, the price, the ease of use, dietary and cultural factors, and food habits/attitudes of consumers.

Based on the above, the **present demand for processed foods** are as follows:

(a) Animal Products including cured fish; frozen beef, fish and chicken particularly in urban areas; salted beef and trotters. Cured fish for example is popular for a number of reasons: (i) because refrigeration is not available to the average Ghanaian (ii) because it is the animal product which most people can afford (iii) because of the flavor it gives to soups and stews (iv) because it can be used for a number of Ghanaian dishes (Orraca & Nyanteng 1977). Frozen animal products such as chicken and beef are popular in the urban areas mainly because they are cheaper than the fresh products.

(b) Root products mainly from cassava are gari, cassava dough and flour (commonly known as konkonte). Gari for example is an instant dry food product which is easily available, easily prepared, cheap relative to other staple food items and has a long shelf life. It is consumed either as a food complement, part of a main meal or as snack. This makes it popular with students in boarding schools and in many Ghanaian homes irrespective of socio-economic background.

(b) Cereal Products mainly from corn e.g. corn dough and flour (roasted and unroasted) and corn drink (commonly known as Nmeda or Asaana). Other cereal products are from millet e.g. fula; sorghum e.g. porridge (commonly known as Hausa koko), a drink (commonly known as pito) and; wheat flour for baking. Corn dough for example is very popular because it is used in the preparation of other secondary products such as ɛenkey, banku and porridge which are commonly eaten.

(c) Legume Products include cowpea flour/paste used in the preparation of fried bean cakes and; groundnut paste used in the preparation of soup.

(d) Oil & Vegetable Fat Products include palm oil, coconut oil, groundnut oil and

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[4] No systematic study of demand for processed foods has been made. The information provided is only an impressionistic view of demand for processed foods based on processed foods commonly found on the market.

kernel oil and; margarine. These oils are in great demand because they form part of the major ingredients in the preparation of most Ghanaian dishes. The coconut oil and groundnut oil for example are used for frying plantain and fish. The palm oil is used in the preparation of stews and soups. Besides the utilization of oil in food preparation, oils such as palm and kernel oil are in high demand because they are used for soap making. Vegetable fat such as margarine are in high demand mainly in the urban areas because they are used as spreads and in baking.

(e) Dairy Products include evaporated milk, milk powder, yoghurt and ice cream. These are in great demand in the urban areas.

(f) Fruits and Vegetables include tomato puree and fruit juices/squashes/syrup especially mainly in urban areas.

The overall demand for processed food may be relatively low for the following reasons:

a) Local manufacturers and food processing entities are not widespread and producing on a large scale. Government made efforts to establish canneries for processing meat and vegetables such as tomatoes and garden eggs but these were not successful because they were under utilized due to irregular and inadequate supply of raw materials and poor management practices.

b) Majority of people live in the rural areas and since they are engaged in farming they find it much cheaper to live on fresh foods which they grow. However the demand for other food items such as processed fish is high. In addition people prefer fresh foods even if their storage life is short and fresh food stuff is available almost all year round.

c) Another factor which has influenced the demand for processed food is the limited processing facilities/technologies available in the country. Even when these technologies exist, other factors impede their adoption. Firstly, very little effort has been made to popularise them to improve upon traditional methods. Secondly, they are not the type of technologies that food processors, majority of whom are small scale, can utilize readily. This is because either the capital/input required is inadequate or absent (e.g. credit facilities), or the capacity of the equipment is such that it cannot be used fully. Thirdly, some of these technologies do not produce the quality of food comparable to what the consumer desires or is used to at home. An example is the preservation of yam and plantain, the instant fufu mix and the fairly perishable food stuffs such as okro, garden eggs and tomatoes on a small scale. As stated earlier, government established canneries to process some of these vegetables but these initiatives have not been successful.

e) Most traditional methods of processing foods are labour intensive, and the products, if packaged at all, are poorly packaged and expensive because inefficient technologies are used. Traditional methods of fermenting food for example still remain inefficient and unappealing in some cases.

f) Effect of Imported Foods on Demand for Locally Processed Foods: Indigenous entrepreneurs cannot compete effectively with imported processed foods especially given the prevailing political and economic climate of trade liberalization. The imported processed foods are of a better quality, well packaged (e.g. dried fruits and biscuits), cheaper and have longer shelf lives.

The present proliferation of imported processed food items of various kind on the market and the patronising attitudes of Ghanaian consumers . Impo -ters such as LIMBREST FOODS with large cold store facilities imports a wide variety of processed and frozen foods into the country which are readily consumed by an increasingly choice-oriented consuming public.

g) The mental attitude and food habits developed by the consumer is also an important factor. For example in the case of instant fufu mixes some people cannot accept the idea that instead of pounding, the fufu should be prepared on fire. Another attitudinal factor which has influenced the purchase of locally processed foods is that some consumers still take pride in buying foreign products (e.g. breakfast cereals) for prestigious reasons or because that is what they are used to.

Medium to Long term Demands for processed foods: The future demand for processed foods in Ghana will depend to a large extent on the growth and development of the national economy. This will also depend on the expansion of the agricultural sector. The agricultural sector's capacity to improve the production of various crops and thus create a climate for adding value to the raw materials produced, as well as, improvements in processing technology, research and development will affect quality and increase demand.

The improvement of the national economy and increased exposure will raise the level of sophistication and economic power of the local population. The additional income and the craving for variety and choice in consumption habits will further increase the demand for processed foods either locally produced or imported. These projections will however depend on an indepth feasibility study and analysis of the food processing sector(UNDP/TCC, 1990)

Another important consideration would be that as population grows, demand for quality processed food will grow. This is because available traditional food processing technologies may not be able to cope with the high demand. Projections based on current population growth rates have predicted increased demand for

processed food products by the year 2000. Hence a need for additional and improved processing facilities for food(UNDP/TCC, 1990). For example based on a population growth rate of 2.6% per annum, increasing urbanization, increase in economic and purchasing power it is projected that demand for maize, rice and wheat flour and their by-products will increase.

These projections include rice from 36,000 tons in 1982 to 159,300 tons in 1995; maize from 264,300 tons in 1982 to 996,900 tons in 1995 and; wheat flour from 25,400 tons in 1982 to 162,000 tons in 1995 (Quarterly Statistics Digest, 1988). Similar projections are made for other food items. The demand for these and other food products will mean greater processing needs since most of these especially grain can be consumed only after primary and secondary processing. This will also require utilizing improved or upgraded technologies to meet this demand both in quantity and quality. Since evidence exists of the capacity of indigenous manufacturers of machines and equipment for food processing, their mobilization and retraining to improve on traditional technologies will complement the use of imported technology (UNDP/TTC, 1990).

Although the capacity utilization in numerous food processing activities is reportedly low, the trend towards increasing capacity utilization has been observed in many reports of the food sector. The domestic demand increase as well as possible establishment of export-oriented food processing activity would create demand for additional processing technologies and hence quality and competitiveness of processed food (UNDP/TTC, 1990).

The Availability of Raw Materials

Adequate supplies of raw materials for food processing are often not readily available all year round. In addition, prices are quite high for those which are available especially in the lean season. Among the reasons are:

1) Traditional agricultural practices, climatic changes, migration of the youth to cities etc. have affected agricultural production and prices of raw materials.

2) One major factor influencing the availability of raw material is money to purchase raw materials. Most processors pay cash for raw materials they use. Very often farmers and fishermen demand spot cash payment for produce sold unless the market favours the buyer in which case the produce (e.g. palm nuts and cassava) is given on credit. To ensure supply of raw materials, women sometimes have to pay in advance or pre-finance the purchase of inputs. For example in the case of fishing, to ensure steady supply of fish, women loan money to fishermen or invest

in fishing equipment. The lack of funds makes it difficult for women to buy the quantity and quality of raw materials they need. This occurs especially in the lean season and at times in the major season (ILO/NCWD, 1987).

3) Most technologies for processing food are traditional and inefficient. The result is often a high cost in utilizing raw materials in processing, even when output is low.

4) Land has been a limiting factor in the availability of agricultural produce. In the case of gari processing for example some women have had to resort to other income generating activities such as selling cooked foods even though they find gari processing more profitable. This is because they have limited access to land to expand their cassava farms (ILO/NCWD, 1987).

5) Access roads have also been a limiting factor in the availability of raw materials. In Ghana most food growing areas do not have good motorable roads all season to enable women transport substantial amounts of raw materials. What they are normally able to carry is limited to what they can carry on their heads. This inaccessibility poses problems for both raw material procurement and marketing of products

6) The socio-economic decline and political instabilities of the country, especially from the mid 1970's to early 1980 grossly affected production capabilities of industries. This had a negative impact on the utilization of, and therefore the production of agricultural raw materials. The integration expected therefore between raw material suppliers and food processing industries could not materialise. Industries could not obtain adequate raw materials in the lean season and in the major season they were not able to process all that the farmers produced.

However, with pragmatic government policies in recent years, many incentives have been given to manufacturers in general and food processing in particular to help them produce and utilize raw materials efficiently. In addition government has provided easy access to imported raw materials when required. For example to help increase food production, processing and preservation, the government's investment code 1985 (PNDCL. 116) makes available some incentives for the agricultural sector. The incentives include capital investment allowances and import of machinery and parts. The idea is to stimulate the use of local raw materials which in turn will stimulate production.

Despite initiatives by government, a number of problems still pose as obstacles in the manufacturing/food processing sector. The falling rate of the local currency (the cedi) against other currencies, especially the dollar; high inflation and interest rates etc. makes imported raw materials very expensive. For

this reason local processors have no incentives to go into production because cheaper imported goods with probably high quality are easily available on the market. The cheaper processed foods on the market has militated against the competitiveness and sustainability of local food processing industries and hence directly or indirectly raw material producers. Although the government is aware of the problems associated with trade liberalization, little has been done to relieve such industries by giving financial assistance and other tax incentives (UNDP/TTC, 1990).

With the inception of the second Economic Recovery Programme in 1986, production of value added goods instead of primary production, for export and home consumption has been given importance. This is especially significant for the food sector where export-oriented processing activities could be improved for goods like canned products, cereals (maize has modest export potential to neighbouring countries), fats and oils extracted from palm and sheanuts and; fish products. Also it is highly possible to export fresh fruits and vegetables to other countries as well as export processed traditional food products such as gari, maize meal etc to European markets where the market for expatriate Ghanaians are high. All these activities require increased technological capabilities as well as increased processing methods. In addition, there is need for efficient quality management and marketing techniques for the sophisticated and competitive export markets.

However to increase the availability of raw materials on a continuous basis especially regarding the use of local raw materials, and thereby stimulating the food processing sector for potential future demand, as well as satisfying present increasing needs, attention must be given to the following:

(1) The need to provide widespread advanced storage facilities for farm produce to help preserve and provide the raw materials necessary for food processing. This will reduce wastage of essential raw materials during the major season.

(2) Credit/financial support facilities for small scale food producers and processors must be stream-lined in the wake of rising interest rates and the cost of production vis-a-vis cheaper imported foods. This situation would enable the local entrepreneurs compete effectively with imported processed food and in the process increase patronage for local raw materials for their activities. This will directly affect the price of raw materials and serve to motivate raw material producers.

(3) Since the projections in demand for food and processed foods look bright - seen specially from the mode of imported foods like biscuits, milk, and many varieties of canned foods and other food complements and condiments, - increasing support and incentives including transfer of technological know-how must be

provided to local entrepreneurs in the food processing sector. Processing local substitutes of the imported goods with indigenous knowledge will be a good opportunity for entrepreneurs in this sector.

(4) Training in management, marketing and modern business trends should be intensified for small scale food producers and manufacturers (UNDP/TCC, 1990).

(5) In addition Ghanaians should be encouraged to patronise made-in-Ghana foods instead of the bias for foreign processed foods. With increasing acceptance of home made foods, agricultural raw material producers and manufacturers in the food industry will be integrated to complement each others efforts for their mutual benefits.

The production of raw materials in Ghana is not considered a problem if all production factors and incentives required for high production are provided(UNDP/TTC, 1990)

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4. THE EXTENT TO WHICH EQUIPMENT RELEVANT FOR SMALL SCALE PRODUCERS (APPROPRIATE TECHNOLOGY) IS READILY AVAILABLE[5]

The technology base for food processing is traditional in many cases. However, recent times has seen significant improvements in and the upgrading of traditional methods of processing. A better understanding of the extent of available appropriate technology for small scale food processors for example, will require some brief analysis of the prevailing activity subsectorally.

A critical analysis of the state of operation shows three types of distinctions:

(i) The use of local materials and methods which are labour intensive. This type of food processing is predominant in the rural areas especially village household levels where the technology for years have been indigenous and traditional. This sub-sector happens to be the largest producers and processors of food, for both the rural and urban populations.

(ii) The use of capital intensive, large scale production and processing methods utilizing specially imported raw materials and technologies.

(iii) The use of a mix of locally manufactured (not highly developed) and imported technology for production.

Of those in group (i) above, food items processed include fish using various methods; roots and tubers such as cassava which is processed into gari; yam and cocoyam into chips or powder for fufu[6]; oil seeds/fruits like palm nuts, kernel, shea nuts, copra and groundnut which are processed into cooking oil/fats and; cereals and legumes which are processed into flour. These food items are processed mostly by women at the village/household level using traditional methods which as mentioned earlier, are strenuous and time consuming. In order to make production efficient and less laborious, new and improved technologies have been developed.

Below are some of the appropriate technologies/equipment developed for these activities.

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[5] Most of the information referred to in this document was obtained from a Report on Food Processing Sector (1990). UNDP/Technology Transfer Centre (CSIR), Accra, Ghana.

[6] Cassava is the most popular staple in Ghana. It is processed into dough, chips, fufu and gari.

In the processing of gari, for example, a grater for grating peeled cassava tubers, a press for removing water from the grated cassava, a sieve for pulverising the pressed dehydrated cassava dough and a roaster for roasting the pressed, dehydrated and sieved cassava dough, have been developed. A peeler was introduced but this was not successful because of the different sizes of tubers (ILO/NCWD,1987). Traditional methods of chipping, boiling, dehydrating yam chips and later powdering the chips in hammer mills is being experimented.

In the case of oil extraction, a boiler/digester, pounder, grater for copra, oil press, boiling and clarifying tanks have been developed.

In fish processing improved ovens like the "chorkor smoker" has been introduced for smoking fish. These techniques are used in the absence of cold storage facilities in the rural fishing communities.

In the case of legumes and cereals simple machines for threshing grains, hand operated paddy husking machines, mechanical and hand operated maize shellers and power milling or grinding machines known as corn mills exist. These grinding machines are normally multi-purpose in operation and used for both dry and fermented material (Kwatia, 1989)).

Even though appropriate technologies exist, the traditional village level technology is still commonly used. Some women for example still use the mortar and pestle, or grinding stone for converting cereals and other food items into flour.

In groups (ii) & (iii), apart from the areas enumerated above where small scale producers especially women predominate and where equipment available are also locally manufactured, there are also those in the sub-sector which utilize modern and/imported technology or a mix of local and imported technology. The development of such enterprises could be traced for example, to the state owned canneries for small scale canning of fish and pineapples established at Osu, Accra in 1955 by the Agricultural Development Corporation.

Similar operations in canning of fruits and vegetables and other food processing units were established in other parts of the country. There could be found advanced processing activities of wheat flour production, dairy products, meat processing, fish canning and storage, meat storage, fruits and vegetables canneries and refined oil producing industries. All these establishments utilized equipments of varying degrees of scale depending on the industry.

The food processing sector has a diversified system, from simple mechanical

equipment and solar driers to high level imported technology requiring both local and imported raw materials. The availability of equipment to small scale producers is dependent on (i) the development of easily adaptable equipment/technologies, (ii) creating the awareness of the existence of such technologies and (iii) making these technologies readily or easily available for purchasing by small scale producers.

(i) The development of equipment/technologies: The development of equipment/technologies has mostly been confined to roots and tubers, grain milling, edible oil and fat production, fish processing and to a small extent bakery and dairy products. An area which remains barely touched is the processing of fruits and vegetables.

If new products especially products from fruits are to be introduced then there is the need to make available, relevant appropriate technologies. Some of the machines required to handle fruit products are a press for extracting juice from pineapples reaming machine for extracting juice from citrus fruits and; simple corking machines, sieving machine and a shredding machine for making peels from citrus fruits for marmalade. In addition vacuum sealers for preserved fruits e.g. crystallized fruits and retorts or pressure cookers for processing non acidic foods are some of the machines needed for food processing. One of the major problems the local engineers face in producing these fruit processing units is the acquisition of stainless steel sheet metal for fabricating the machines. Very little of this metal exists and it is very expensive.

The acquisition of stainless steel sheet metal which is expensive but durable raises an issue worth considering in the development of appropriate technologies. Very often with large-scale production, all the processes can be mechanized and the scale of production makes the purchase of equipment profitable. But in the case of small-scale producers the issue often is how to select those technologies which provide some advantages over the traditional methods at reasonable prices. In order to make equipments affordable, most times cheap materials which are not durable are used and this needs to be replaced often thus making such equipment more expensive in the long run.

In the case of cereals and legumes, an equipment for winnowing is needed. Very little has been done by way of research into simple hand-operated winnowers. In addition machines for threshing millet and sorghum are not common. There is the need to introduce simple hand-operated machines for this purpose (Kwatia, 1989).

Lack of adequate and appropriate packaging materials and equipment also makes it difficult for small producers to become competitive and thus utilize some

of the technologies introduced.

(ii) Creating awareness of the existence of technologies: Since most of the food processing activities are rural based, information is often beyond the reach of these entrepreneurs partly because of the poor communication network in the country and also because most of these people are illiterate. Access to the mass media such as television and radio is limited. Most of these people cannot read newspapers/letters, brochures and bulletins which often carry news about these technologies. In some cases some of the publications are so scientific that the end users cannot make use of them.

There is also no linkage between the food technology researchers and small scale food processors. In the agricultural production sector there are extension workers who go to the farmers. There are however no trained food technology extension workers. The researcher may have to do the extension work as well (Mensah, 1989). With the establishment of the Technology Transfer Centre (TTC), Gratis and ITTUs, this may change.

(iii) Making technologies readily/easily available for purchasing: This refers to production of the equipment and easy marketing outlets for the equipment. The dependance on foreign inputs has on some occasions limited the production of equipment when it is needed. A case in point is the experience of National Council on Women and Development. Though existing technologies revealed several possibilities at the time of the project, several manufacturers had gone out of production due to lack of imported raw material components. The project had to import raw materials for an indigenous manufacturer to produce the improved equipment (ILO/NCWD, 1987).

In relation to easy marketing outlets, most of the technologies developed are often found in or around urban centers. In addition, most women are not well informed as to where or how to acquire these machines. Very often those who wish to have any of the processing equipment will have to go through either a research institute, a local manufacturer mainly in the major cities (Accra, Kumasi), or be part of a group within a development project. Where awareness has been created, such as through exhibitions, fairs, etc, contact persons, particularly extension officers, are not easily accessible or well informed to influence the women to pursue and adopt the new ideas (Osei-Opare, 1989).

(iv) Adoption of the technology by end users: Inspite of new and improved technologies introduced, the rate of adoption of these technologies is limited for a number of reasons.

a) **The capacities of the equipment:** The capacities are often too big for the size of their enterprises. Also at times machines are situated in areas where the women

do not get enough raw materials to enable them use the machine at full capacity.

b) **Cost of the equipment:** Although these machines are relevant most women find them to be too expensive. Majority of the women because of the size of their businesses and requirements of banks do not have access to credit facilities.

c) **Operation of the equipment**[7]**:** In a number of cases even though the equipment is available, women have to depend on men to operate some of the machines introduced because they require strength and skills which invariably intimidates the women. Women have to depend on men, who often own such equipment, and thus do not have any control over the handling of the machine hence when there is a breakdown, their business operations cease until owners decide to get it fixed. Where common service centres have been established women have to wait long hours to have their produce processed. These situations do not allow for regular flow of materials and continuity of the business.

Women in our society are also not used to handling mechanical and electrical equipment. In the field of food processing the major work is done by using traditional methods which utilize a lot of manual labour and simple tools or equipment. A technology like an oil press, cassava grater or corn mill therefore is viewed as a complex innovation thus affecting the rate at which women themselves accept to run these machines.

d) **Dependence on foreign inputs:** Some of the processes require additional foreign inputs for example packaging materials(e.g. jars and cans), spare parts and raw materials (e.g. sugar and wheat).

e) **Poor infrastructure:** Poor infrastructure such as access roads to convey sizable amounts of raw materials; the absence or irregular supply of electricity and water makes efficient utilization of technologies not possible. The non availability of these inputs still makes available appropriate technologies demanding. For example the processing of raw materials such as fresh cassava or palm fruits require large amount of water for cleaning before and after at the plant but in most villages where technologies have been introduced water is very limited. The result is increased number of trips for water to process good amounts of fruits for equipment which have been introduced to work efficiently (Anokwa, 1989)

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[7] The information here is obtained from Osei- Opare, F. (1989) Food Technology Adoption, Socio-Economic Implications: In proceedings of a workshop on Harnessing Traditional Food Technology for Development.

f) **Method of introducing technologies:** Most interventions introduced into traditional food processing have been on installment basis i.e. parts of the process have been added, like graters or oil press. While new ideas should be introduced cautiously, it is important to recognize some negative aspects of this approach. In gari processing for example until improved roasters were introduced, the benefits of improved grating methods/equipment was not beneficial because roasting the grated cassava was still time consuming. While introduced mechanical graters encouraged women to process more, the potential was not fully realized because the process was slowed down at the roasting stage (Osei-Opare, 1989).

There is evidence of considerable local technology in use and therefore a locally developed technology base is available for the main staples of the country and for the producers. A survey of machinery use, as well as machinery manufacturing capability in the country has indicated a domestic capability for the manufacture of certain machinery and machinery component for the food processing sector. The important thing would be the mobilization of this manufacturing capability to improve more on what exists now utilizing the skills and resources available locally and also recognizing the advantages of the traditional methods in the overall environment in which they operate.

Also technology that is available in other developing countries of the world such as Asia where similar small scale operations are productive should be documented and made readily available as packages for dissemination to would be entrepreneurs in the food processing industry.

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