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PREFEASIBILITY STUDY ON WOMEN'S INTEGRATION IN DEVELOPMENT
FOOD LOSS PREVENTION PROJECT

CASE STUDY: TOGO

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INTRODUCTION

Project background and justification

The marked decline in food production in Africa during the past few years has become one of the major concerns to people and mostly to the international community. For most of the African countries food self-sufficiency is becoming the top priority and all necessary efforts have been made to reach that goal.

In the West African area and mainly in the Sahelean countries, the food and nutrition status is even compounded by natural factors that are difficult to control such as drought, causing increasing concern.

Although currently Togo is not too much affected by the effect of drought this country is nevertheless confronted by food and nutrition problems. Thus, in the rural development sector, the objective of the Fourth Plan (1981-1985)is to ensure food-self-sufficiency and agricultural development has become the top priority of the country.

The means to achieve the objective of food self-sufficiency are diverse but the most comm.n policy way is to increase production.

However there is an undeniable fact: pre- and post-harvest food losses reduction could contribute significantly in increasing food availability since, according to some specialists, these losses can be as high as 30 per cent of total potential production.

The many studies carried out in Africa on the division of labour according to sex in rural areas have shown that post-harvest activities are mainly done by women, especially in West Africa. In addition to drying and storing food crops that they have generally contributed to cultivate, women also carry out the threshing, fanning, husking, ginning and grinding activities necessary to process the grains for human consumption. For the other crops such as cassava, fruits and vegetables, processing and storing are essentially women's activities.

In discharging this responsibility, women have to carry out many low productivity and time consuming chores. To large extent, the methods and techniques that they use are still unsophisticated, inefficient and fatigue generating.

In this context the Econonomic Commission for Africa took the initiative to carry out a study on the role of women in reducing food losses which will focus both on technologies used by women for after-harvest activities and on the nature and causes of losses that result from the use of those techniques.

The project is consistent with the general recommendations of the Lagos Plan of Action concerning increase in food production and the reduction of food losses in particular.

It is also consistent with the global programme of action consecutive to the recommendations of the World Conference on Land Reform and Rural Development since it focuses on a section of the working population in rural areas, i.e. women which is a very important segment of the man-power resources in food production.

The project is also consistent with the criteria used in the various programmes of action that were recommended in the Regional Food Plan for Africa since one of its long-term objectives is to achieve food self-sufficiency.

Objective of the project

Development objectives

The long-term objectives of the project are as follows:

(i) To identify and assess traditional techniques used by women; particularly those techniques that ensure substantial reduction in food losses and increase the supply of tropical cereals, vegetables and fish products;

(ii) Introduce women in rural areas to modern techniques to make them more receptive to technological developments and to enable them to express more clearly and more precisely their needs in agricultural development activities;

(iii) To reinforce women'sskills in management in order to improve their ability to manage small-scale industrial enterprises;

(iv) To better encourage consumption of locally produced basic food stuffs in order to reverse the trend towards increased dependence on imported food products and thereby reduce balance of payments problems.

Immediate objectives

The immediate objectives of the project are as follows:

(i) To identify and assess traditional techniques currently used for production, processing, storage, transportation and marketing of basic food stuffs such as maize, millet, sorghum, rice, wheat, tubers (cassava, yam, potatoes), vegetables and fish products;

(ii) To adopt and disseminate appropriate techniques that are efficient enough to reduce post-harvest losses;

(iii) To identify those institutions that can ensure a substantial development of these techniques;

(vi) To disseminate the data collected in member countries in order to enable them to improve their food status and thus reinforce their own capabilities.

Objectives of the study

The objective of the study is to attempt to find a better way of integrating women in development by reinforcing their role and their participation in activities aimed at reducing food losses. For that purpose, the study should make it possible to:

- identify and assess local techniques and other means which are used by women or which are available to them for harvesting, processing, storing, transporting, and marketing agricultural products;
- estimate post-harvest food losses incurred by women at all stages of the process and determine their causes;
- assess the current Government policy as well as efforts aimed at reducing food losses;
- assess the impact on women of previous or current projects on food losses, undertaken by FAO and other organizations;
- on the basis of the results of the study make concrete recommendations on these problems either in the form of policies, measures, programmes on projects which once implemented will contribute to improve women's status in society and increase productivity through the use of improved post-harvest techniques.

Methodology

The study was carried out as a field survey, interviews with Government officials, other persons and institutions involved in production, collection, processing and marketing of agricultural products.

The survey on food losses incurred by women covered two areas: the maritime region and the plateau region. The sample was made of 931 women producers and the crops studied were maize, cassava, rice, sorghum, and yam. Fish was also covered by the study.

The methodology of the survey and the organization are described in the appendix.

PART I: The national context

1.1 Geographical data

Located in the Northern Hemisphere of the African continent between latitutde 6 and 11 North, Togo is a small country covering an area of 56,000 sq.km. and shaped as an oblong rectangle. Its average width is 90 km and its length is about 650 km. It strenches 550 km into the hinterland and its width from West to East is 140 km.

Because of its geographical location, Togo is subject to the seasonal influence of the high pressure zones of the Sahara and the Atlantic respectively. During the Northern winter, with the predominance of the Saharan anti-cyclone, the harmattan, a dry and dust raising wind sweeps Togo from the North-East. In summer, the monsoon from the South-East, under the influence of the St. Helen anti-cyclone carries rain and the humid winds from the ocean.

The country is practically divided into two climatic regions: in the North a Sudanian climate with a single rainy season (from May to October) and one dry season; in the South an Equatorial climate with two rainy season (long rainy season from April to July and short rainy season in October); the plateau region can be considered as a transition area.

The temperatures are influenced by altitude or the vicinity of the sea, they are seldom excessive and they vary between 25 and 35 degrees Centigrades depending on the season. The maximum mean temperatures increase from South to the North of the country and the highest temperatures are those that prevail at the end of the dry season, before the beginning of the first rains.

The topography of the country governs a very peculiar rain pattern varying from 80 cm on the coast to 160 cm. in the mountains. Relative humidity is highest along the coast: 80 to 85 per cent. During the rainy season it reaches 85 per cent but in the dry season it declines considerably and falls to 20 per cent in the North when the harmattan is blowing.

About a quarter of Togo's area is covered by mountains. A range of mountains with a mean altitude of 600 m. runs diagonally across the country from the South-West to the North-East. The highest peak is Mount Aojou with a little over 1,000 m. above sea level.

1.2 Administrative characteristics

The Togolese territory is divided into five administrative regions, supervised by regional development bodies which receive the following international or bilateral financial and technical assistance:

	Regions	Aid
1.	South (maritime region)	FAO/AID (IBRD)
2.	Central	German bilateral assistance
3.	Kara	UNDE/FAO
4.	North	EDF
5.	Plateau	USAID

The regions are sub-divided into 19 districts which, according to their size can also be sub-divided into several of the smaller-units called "cantons". The country has about 2,500 villages. Since there is administrative authority at the regions level, the district heads report directly to the Ministry of Interior. Villages are normally under the administrative supervision of the cantons but there is a great number of independent villages which are directly under the districts.

1.3 Population

The Togolese population is made of about 40 ethnic groups, the most important of which are the Ewe, the Kabye, the Ouatchi, the Cotocalis and the Mina; together they make up about 60 per cent of the total population.

According to the May - April 1970 census, the population was 1,950,646 persons. The last general population and housing census made in November 1981 is still at the stage of data collection but its initial results indicate a population of 2.7 million people.

The annual main growth rate between the 1958-60 census and that of 1970 is estimated at 2.7 per cent. Life expectancy from birth is estimated by the United Nations at 44.4 years for men and at 47.6 years for women.

Women make-up 51.8 per cent of total population (FAO report on the 1970 World Census of Agriculture, Rome, 1978) and children less than 15 years old represent 55 per cent of the population.

Population density was estimated in 1980 at 44 persons/s .km. This average figure reflects very diversified regional situations: from more than 140 inhabitants per sq.km. (maritime region) to 17 inhabitants/sq.km. (Central region). The country has only one big city: Lome, whose population in 1980 was estimated at 240,000 inhabitants. Sokade: the second biggest city in the country had only 35,000 inhabitants and the population of the urban centres in the country did not exceed 30,000 persons. 85 per cent of the population live in rural areas.

1.4 Economic features

At the time it gained independence, Togo was among the poorest countries in the world; however during the past few years its economy has considerably developed although it has been declining since 1970.

Between 1975 and 1980, the economy grew at a slow pace and a growing deficit followed the inactivity in phosphates production and export. Export crops are also on the decline.

According to World Bank estimates, the gross domestic product per capita was US$380 in 1980 but in the rural areas where 80 per cent of the population live, annual income per capita was only US$180. The contribution of agriculture to GDP is about 30 per cent.

During the 1975-1980 period GDP growth was 2 per cent per annum (source: World Bank). A large portion of investments was made in the secondary and tertiary sectors enabling them to develop more rapidly. In the primary sector, investment was relatively less substantial and its development has been rather slow. Thes could also be attributed to the inefficiency of extension services, to the lack of price incentives in agricultural production and to the recurrent droughts.

GDP distribution by sectors highlights the economic importance of phosphates: in the secondary sector, manufacturing industries have a rather low position. The primary sector is still stagnant but the tertiary continues to thrive mainly because of the development of the business activities which make up about 18 per cent of GDP.

Togo is a country where State intervention is limited and where the private sector remains predominant especially in agriculture and trade.

PART II: Agricultural and food status of Togo

2.1 The Togolese agriculture

Togo is an agriculture-oriented country. The majority of the Togolese population depend on agriculture which provides 80 per cent of total employment. According to FAO estimates, the farming population was 66.68 per cent of total population in 1982 while it was 73.31 per cent in 1970.

The agricultural sector is mainly traditional with low yields and 70 per cent of the food crops produced by small-farms. However cash crops (cocoa, coffee, palm oil and more recently, cotton) are gaining ground and provide 30 per cent of Togo's foreign currency earnings.

During the 1975-80 period annual growth in agriculture was 2.5 per cent (World Bank). Between 1975 and 1977, agricultural production declined because of inadequate rainfall due to climatic variations but increased during 1978-1980 period when the climatic situation was favourable.

About 11 per cent of Togo's area is cultivated; the proportion varies from 20 per cent in the densily populated maritime region to 4 per cent in the Central region.

The main food crops in Togo are:

- maize and cassava in the South;
- yam and sorghum in the Central region;
- millet and groundnuts in the North.

Maize which is the main staple food of Togolese women makes up more than 50 per cent of the country's cereal production. It is generally cultivated in association with legumes such as groundnut and beans (niebe).

2.2 Nutrition and food situation

On the whole, the Togolese population is not under-nourished. It can be said that during normal years, the country is almost self-sufficient in basic food-stuffs. In urban areas, the diet is in general more balanced and more varied than in rural areas and include a higher level of fruit, vegetables, meat, fish and cereals and less tubers.

Net food supply is estimated at 2,106 calories and 46.5 gm. of protein per person and per day for the 1978-1980 period (source: FAO production year-book). More than 96 per cent of the calories are supplied by vegetable products, specially cereals, roots and tubers.

As regards animal products the picture is somewhat gloomy. According to FAO estimates the value of imported living animals (cattle, sheep and goats) and meat (fresh, chilled and frozen) amounted to 15.32 per cent of the value of imported agricultural products from 1982, while fresh, condensed and dried milk imports amounted to 5.2 per cent of the total value of imported agricultural products.

As for fish, despite the abundant resources that are available, national production does not meet local demand. From 1978 to 1981, annual fish product imports including fresh, chilled or frozen fish, dried, salted or smocked fish as well as fish products and preparations reach 7,852 tons amounting to US$3,349,000 (source: FAO Fishing Statistics Year-book).

Sorghum and millet which account for 45 per cent of total cereal production in Togo are predominant in the Northern part of the country and in most part of the Savanna region. One-third of the total production of sorghum is used to manufacture local fermented beverages (Jean Cajuste, Etude des perspectives de production de cereales au Togo pour (1972).

Rice which is cultivated in almost all the regions represents only about 5 per cent of total cereal production in Togo.

Togo is an important cassava producer, a food-stuff that is processed on a large scale in cottage industries. Gari a highly relished pre-cooked home-processed semolina that can be preserved for a long time is the most frequent form of cassava consumption. However, when available, maize is preferred to cassava. In that case cassava is considered by the farmers as a cash-earning secondary crop that will also make up for a poor maize harvest.

Cow-pea and groundnuts are mostly produced in the North. Nevertheless they can be found in all other regions.

Demand for yam is continous but cannot be totally met due to a lack of facilities to store the tubers for consumption and reproduction.

PART III: Women's role in the production and distribution of food-stuffs

3.1 Food crop productions

In Togo, more than 75 per cent of women are involved in agricultural activities and particularly in food crop production. They account for 40 per cent of tilling operations, 80 per cent of sowing activities, 70 per cent of weeding work, 70 per cent of harvesting operations, 95 per cent of processing activities and 90 per cent of sales operations (source: Republique Togolaise. Direction gegerale de la Condition feminine. Programme d'amelioration du role de la femme dans la production alimentaire, octobre 1983). But their productivity remains generally low.

By contrast, men play a more important role in export-oriented crops and in yam cultivation. Women are also predominant in vegetable cultivation. These are grown in plots located around the family house or in outside fields in association with other annual crops or still as an intensive out-of-season bottom lands single crop.

3.2 Animal productions

In Togo, poultry husbandry is mostly done in the country's small-scale farms. It is a typical women's activity. Sometimes, women also invest their income in the purchase and rearing of small ruminants, i.e. sheep and goats. Investment in large animals is less popular the more so as these must be kept by Peul herdsmen who in most cases have to be paid for their services. However, the wealthiest women or the big business women have some cattle herds. But the share of women in livestock production is not known.

3.3 Distribution and marketing of food-stuffs

While foreign firms and middle-men account for a substantial share in the distribution of imported food-stuffs, marketing of local food products is entirely in the hands of Togolese women.

The traders can either be producers or retailers. Marketing always takes place on markets and from the producer to the final consumer in the capital city, transactions are carried out on different markets of increasing sizes. At the producer level, the production surplus is sold on the nearest market. The same produce will be found at a furtehr stage on the bigger market of the neighbouring village.

(a) Cereals

Before Togo-grain was abolished, a Government Agency for the distribution of grain cereals were entirely marketed by women throughout the whole network. Since then, Togo-grain has become responsible for storing and distributing a certain portion of the production of grain, although most of it is still marketed through traditional channels controlled by women.

(b) Cassava

Most of the cassava production is processed into gari by women. In general, cassava is first sold while the crop is still on the field to the women who harvest it, peel it, grate it, press and cook it.

The first sale is strictly limited within the producer village while the distribution of gari takes place at different stages similar to the grain marketing process. The produce is brought down to the final consumer through various markets of different sizes.

(c) Yam

Its trade is almost entirely controlled by women. The marketing channel is not different from the one followed by grains. On the contrary losses due to rot and deterioration are heavier in this case.

(d) Rice

Most of it is still imported through big trading firms. Marketing of domestic production is of the simplest. From the producer, the rice is passed on to the consumer or to the retailer through the only possible intermediary which is the co-operative. Extension services and the development corporations assist in this process.

(e) Fish

The market has two aspects: fresh fish on the one hand, and preserved, dried or smoked fish on the other.

As far as fresh fish is concerned, the traditional channel is one of the simplest. The fishermen's catch is bought by women retailers who carry it to the market possibly under ice blocks.

There are two soruces of supply for dried or smoked fish: either directly from the fisherman, or from the retailers when the fresh fish market is slack keeping the supply high. The processed fish is then sold to other women-retailers who distribute it on the market. Frozen fish is becoming more and more popular on the market. The channel is identical to the traditional fish distribution network. Retailing, processing and second or thrid stage marketing of frozen fish are also controlled by women.

Processing of agricultural products

Processing and preparation of agricultural products are exclusive women's preserves. Thus millet and maize-beer brewing, cassava processing into gari, fish drying and smoking are operations entirely performed by women. Although the technologies used are traditional, they are well adapted and do not result in important losses.

3.5 Access to production inputs

Land

Farms in Togo are limited in size. Land ownership is the prerogative of village authorities and land belonging to the clan or to the family cannot be expanded indefinitely since land is sold only in cities and very seldom in rural areas. Technological constraints also account for the small size of the plot that can be cultivated by a family since the hoe is the predominant tool used to till the earth.

Fields belonging to, and cropped by, women are generally even smaller.

The land is considered as the common property of the village community which allocates plots to the families. These are controlled by men who lend or rent part of the plots to women. However, owing to the fact that such arrangements are not respected in many cases, the women are never assured of using the same land for a long period.

When the head of the family dies, his land is divided between his sons and his widow loses the field she has been cultivating and must refer to the rightful heir to allocate another plot to her. Although the widow can in principle depend on the family for assistance, sometimes the situation may be less favourable.

Lack of direct access of women to land ownership undeniably bars them from making the investment required for increased productivity. The gradual opening of land tenure to private ownership will marginalize women farmers even more.

Agricultural credit

Since 1967, Togo has established a national agricultural credit fund (CNCA) which provides loans to farmers at interest rates below the commercial banks' rates. The most frequent loans are medium-term loans (five to six years) for equipment or rehabilitation of cash-crops (coffee, cocoa-trees), and short-term or growing seasons loans to enable farmers to cover their annual production costs.

Like men, women are entitled to borrow money from CNCA. Membership in a community is a favourable factor because co-operative communities act as a guarantee to the borrower.

6. Women communities and associations

6.1 The national association of Togolese-women (UNFT)

UNFT is a politically oriented association. It is the women's section of the rassemblement du peuple togolais (RPT) chaired by the Minister for Social Affairs and Women's Welfare. It has developed a plan of action involving field projects but its activities are based on voluntary contributions while its own resources for project implementation are very limited.

6.2 Women's communities

Traditional women in rural areas get together to cultivate a collective field after they have cultivated their husbands' field and their own. They generally work two to three times a week in the collective fields. In 1981 there were about 250 women's communities throughout Togo (sources: Republique togolaise, Direction de la condition feminine) varying from six in the central region to 120 in the savanna region.

The number of women per cummunity varies from 10 to 60 and the area developed from 0.50 ha. to 11 ha.

Women's associations for food production are specialized in the regions' specific crops. The harvest is, depending on the region stored in a collective granary to bridge the gap or divided among the members or among distributors. Once it is sold, the profit is divided into three parts. One third is given to the members, the second is kept at the bank to help members in need of cash or to help finance work of public interest (school, clinic etc); the third used to cover small costs relating to the common field.

In the urban areas there are also food distribution associations.

Associations created at the women's initiative are chaired by a chairperson who is not necessarily the one with the highest social status but ra rather the one that is the most enterprising.

Members are requested to pay a contribution but the Direction de la condition feminine' is also providing technical, material or financial support from its operating budget or from the following agencies: USAID, Pathinder Fund, FAO.

The main objectives of these women's associations are to improve women's productivity, to increase their incomes, to improve family nutrition and prevent malnutrition, to train and educate women and to give new emphasis to traditional feelings of solidarity between the members of the community.

7. Ministry of Social Affairs and Women's Welfare

The Women's promotion division in the Ministry for Social Affairs and Women's Welfare is the Government institution specially entrusted with women's affairs. To carry out its task, it closely co-operates with UNFP at all stages of its action. In addition, it is supposed to collaborate closely with the Social Affairs division which is older and has more resources. But it appears that in practice that co-operation is less efficient than provided for in theory.

Though very ambitious, in general the division's objectives are nevertheless laudable.. Its programme for improving women's role in food production includes the following activities:

- Women's technical training;
- Training in co-operatives;
- Improvement and increase of plant materials;
- Education for better nutrition;
- Functional literacy campaign.

This programme covers both agriculture and livestock production.

8. Ministry of Rural Development

The Rural Irrigation and Co-operative Action Division in the Ministry of Rural Development is also supposed to carry out action to improve women's status. But its activities are still limited in scope and mainly directed towards typical household education activities.

PART IV: Nature and scope of food losses in after harvest activities carried out by women

In the following chapter the products enumerated hereunder have been studied: maize, cassava, rice, sorghum, yam and fish. The differnt operations or processes used after the harvest and until consumption of the products, the traditional methods used for these operations and if possible losses that take place at each stage of the post-harvest system will be described.

For a better understanding and interpretation of information and data provided in this report it is necessary to give some details on the concept of food losses as it has been conceived for the purpose of this survey.

Losses that have been studied in this report are a quantifiable reduction of food products which results from damages caused by mould, insects, rodents and others. Losses in quality leading to a reduction of the nutritive value of the product have not been taken into account. Nor have weight losses caused by a reduction of the water content been considered.

These losses can also be a consequence of leaks caused by handling, especially during transportation or preparation of the food stuffs. Finally, grain stolen at the grinding mill and which has been reported by some of the women interviewed has also been considered as losses.

The method used to assess the losses suffered by the women farmers at the different stages of the post-harvest process consisted in asking her the quantity of food stuff lost during the operation.

Once the quantity harvested, processed, transported and stored had been estimated it was possible to work out the percentage of losses. In certain cases it was not always easy for the interviewed to provide the data required but we can say that on the whole the data collected can be considered as valid to describe the situation.

1. Maize

1.1 Harvesting

Harvesting is always carried out by hand and generally with the participation of women. Indeed cases where women are not involved are rare especially in the plateau region where only 2 per cent of the women interviewed reported they did not participate in harvesting operations. However that figure soar to about 15 per cent in the maritime region. In most cases, women are assisted by the members of households or by other persons (49.13 per cent in the maritime region and 86.58 per cent in the plateau region) but in some cases she may work alone (34.78 per cent of the cases in the maritime region and 11.4 per cent in the plateau region). Using paid workers is not very common. It has been observed in 6.7 per cent of the cases in plateau region but none of the women interviewed in the maritime region had used remunerated workers for maize harvesting.

1.2 Husking

Husking is also done by hand (100 per cent of the cases observed in both regions). Husks removed in this way are used differently according to the regions. In the plateau region husks are generally discarded (98.65 per cent) whereas in the maritime region they are used either as fuel or in food processing.

1.3 Ginning

Ginning is the operation carried out to separate the grain from the plant. The most commonly used manual method is to rub two ears against each other with or without a tool. In the maritime and in the plateau regions more than 89 per cent of the women interviewed used that method. In general maize ginning is essentially a woman's activity that does not involve many problems.

1.4 Sorting and fanning

After ginning, the grain is cleaned to eliminate impurities and waste materials. Fanning is also an operation almost exclusively performed by women, most of the time with the help of their children. However 58.37 per cent of all women interviewed in the maritime region and 42.28 per cent women in the plateau region carry out this activity by themselves.

1.5 Grinding

Grinding is the operation carried out to turn the grain into farina used to prepare national dishes. In Togo, or at least into two regions covered by this study, grain grinding takes place in mills which are generally privately owned. The charge for grinding 10 kilogrammes of grain varies from 100 to 150 CFAF in both regions.

1.6 Storage

In the two regions covered by the study, families generally store their harvest inside or close by their house (95.21 per cent of the cases observed in the maritime region and 71.81 per cent in the plateau region). However some farmers store their harvest in their field (26.84 per cent of the women interviewed in the plateau region and only 3 per cent in the maritime region).

Different methods to store maize have been identified but the most commonly used is the open granary. In the maritime region, 58.70 per cent of the women store their maize in granaries, 6.52 per cent in jute bags, 2.18 per cent in pots and 31.73 per cent use other methods that have not been described with precision during the study. In the plateau region, percentage of women using open air granaries is to 78.48 per cent; those who keep their maize in pots were 11.41 per cent while 14.19 per cent are using other methods.

The traditional granary called "ebli-va" or "kedelin" is made up of husky maize bound up in the shape of a cylinder on a wooden platform. The platform itself is supported by stones almost one metre high. Every three rows of ears, the stock is maintained by a solid rope that runs around the external wall. The whole set is covered by a thatched roof that the farmer can remove to draw from his stock as the need arises. The size of the granaries varies according to the farmers' storage needs. This storing system seems very well adapted to the environment. It is a traditional method handed down from generation to generation and which apparently does not cause too many problems.

According to the results of the survey, pre-harvest treatment to protect plants during storage time is not at all common among women farmers. Indeed only 4.35 per cent of women interviewed in the maritime region and one woman out of the 149 women interviewed in the plateau region reported having treated their maize fields. However it seems that greater emphasis is given to treatment of stored crop in the maritime region where 19.13 per cent cases pesticide use and other treatments were observed. Unfortunately, more than 97 per cent of the women interviewed in the plateau region had not treated their maize stock one way or the other.

Generally speaking maize is not stored beyond six months, probably because of the double harvesting system. In the maritime region, 50.86 per cent of the women interviewed stored their maize for a maximum of three months, that figure being 30.20 per cent in the plateau region. 44.79 per cent in the maritime region and 54.36 per cent in the plateau region store their maize up to six months.

1.7 Marketing

Most of the women farmers interviewed in the two regions produce enough for their subsistance and had even surpluses to be sold later on. However 25.21 per cent of the women interviewed in the plateau region reported they did not sell because the grain harvested was just enough for their consumption. Maize is generally sold on retail but sometimes farmers may sell either all or part of their products to wholesalers and/or to Togo-grain. In any case, more than 95 per cent of the women in the maritime region retail a large part of their production; in the plateau region this percentage is about 57 per cent. In principle the women farmers start selling a production three months after harvesting, most of the grains being sold about six months after the harvest. However in the maritime region 20 cases (8.70 per cent) have been observed where total production was sold immediately after the harvest. In general, the woman sells her production at one go (96.55 per cent in the maritime region and 82.40 per cent in the plateau region), but 8.86 per cent of sales made by the sample women were spread over a certain time.

1.8 Transportation

In all cases observed in two regions (more than 90 per cent) husky or husked maize is transported by humans on their heads most of the time in basins, whether from the field to the house or from the house to the market. However, in cases where the maize field is too far away from the house a truck is used to carry the crop.

Waste materials and losses

Losses occurred at all stages of maize handling from harvest to marketing. Although it was not always possible to quantify those losses for all operations one can say that they do not exceed 5 to 6 per cent for the whole post-harvest system. Actually the units of measure used by the women interviewed to measure losses often varied from village to village which made it difficult, indeed even impossible to compute a mean for the whole sample. We consequently think that since quantitative data are not available the percentage of women who reported the losses incurred during the handling operation could stand as a valuable piece of information in the assessment of the nature and scope of the problem.

For losses occurring during storage we could calculate an approximate mean for each cause reported on the basis of available data. Thus, in the maritime region losses caused by mould are estimated at 0.36 per cent of the stored quantity, those by rodents are 0.57 per cent and those due to insects are 0.81 per cent. In the plateau region these percentages are 2.66 per cent, 2.04 per cent and 1.37 per cent respectively. The following Table shows the per centage of women having reported losses due to insects, mould and rodent during storage.

Number of persons having reported losses while maize was under storage

Cause of loss	Maritime region total interviewed = 230		Plateau region total interviewed = 149		Total total Sample interviewed = 379	
	No.	Percentage	No.	Percentage	No.	Percentage
Mould	90	39.13	32	21.48	122	32.19
Rodents	136	59.13	98	56.77	234	61.74
Insects	188	81.74	52	34.90	240	63.32

More than 60 per cent of the persons have therefore suffered losses due to rodents and insects while those who incurred losses caused by mould amounted only to 32.19 per cent for the two regions.

Concerning the other handling operations, i.e. husking, ginning, sorting, fanning grinding and transportation, the following Table gives the number of persons having suffered losses.

Maize - Percentage of women having suffered losses during operations described below

Operations	Maritime region total interviewed = 230		Plateau region total interviewed = 149		Samples total interviewed = 379	
	No.	Percentage	No.	Percentage	No.	Percentage
Husking	130	56.52	46	30.87	176	46.44
Ginning	130	56.52	64	42.95	194	84.35
Sorting-fanning	188	81.74	83	55.70	271	71.50
Grinding	193	83.91	103	69.13	296	78.10
Transportation						
- to the field	42	18.26	45	30.30	87	22.96
- to the market	41	17.83	32	21.48	73	19.26

The majority of the women (78.10 per cent) who took their maize to the mill for grinding said they had lost a small percentage of their product. Although they were reluctant to talk about the cause of those losses they nevertheless indicated that they were essentially a consequence of poor handling by the miller.

2. Cassava

The survey on cassava covered 230 women in the maritime region alone. The second basic food stuff in Togo after the cereals (especially maize), cassava is a substitute for maize when the latter is not available. It is mainly consumed in the form of gari but it is also eaten fresh or as chips. The following study will therefore focus on gari processing, marketing, and storage.

2.1 Peeling operation

Peeling is an operation in which women participation reaches 98.26 per cent. This essentially feminine operation is entirely performed by hand (100 per cent) and the use of paid workers has been observed in only 5.21 per cent of the women interviewed (12 cases out of 230). Involvement of the husband has only been reported in 36 households representing 15.15 per cent of the whole. Women, whether seconded or not by the households and/or other persons play therefore the central role in this operation.

2.2 Grating

Cassava is normally grated by hand (96.52 per cent of the answers) with a small grater. However 11 women reported that they resorted to mill grating for quantities of cassava exceeding 200 kg.

2.3 Pressing

Most women farmers press the grated cassava at home (71.73 per cent) and by hand (89.56 per cent). Grated cassava is put in a jute bag and crushed with a big stone.

In general, pressing lasts two days before all the water is completely drained. However, this operation can be carried out in the field (27.82 per cent) and with a machine (10.43 per cent). In general starch is not collected but when it is, it is used to make tapioca.

2.4 Cooking

Gari is still cooked traditionally either at the field (27.82 per cent) or at home (72.17 per cent) in a kind of large tin vessel.

2.5 Markeing

90 per cent of the women surveyed sold at least part of the gari they cooked. The sale takes place mostly at the market (81.76 per cent of the cases) but also at the field and at home. All the persons surveyed had retailed their products. Gari is generally carried by humans on their heads upto the market.

2.6 Storage of gari

Over half of the women interviewed (52.62 per cent) did not store their gari. They prepared their products as the need for consumption and sale arose. Otherwise gari is kept at home in jute-bags (7913 per cent of all answers), in wash basins or other types of vessels (20.86 per cent).

Cassava waste and losses

No losses were reported during the peeling operation which is entirely performed by hand. But it is not impossible and is even likely that a certain amount of starch iw removed with the peelings. However the women surveyed were unable to make an estimation of this loss which is insignificant in any case.

During the grating operation 98 cases were recorded where losses had been incurred during manual grating. The percentages vary from 0.01 per cent to 2 per cent but the average is 0.81 per cent. Four out of those who took their products for milling reported losses and three out of the four estimaed the loss at 1 per cent, one at 0.1 per cent.

During pressing, the losses consist mainly earth in stained produce or in food eaten by predators. It was not possible to have an estimation of those losses but 17 cases of losses caused by predators were recorded, 11 cases from unidentified causes and 51 cases of earth stained produce were observed.

At the distribution stage, losses in gari can generally be attributed to handling. They are insignificant although they vary from person to person. In 100 cases representing 43.48 per cent of the persons interviewed, the average is 0.36 per cent of the total quantity sold at the market. About 20 women said they had incurred losses but it was not possible to have an estimation of the amount.

Fish

Women control most of the fish sector. All operations from unloading to consumption are the exclusive responsiblity of women.

Fish products are sold by fishermen to women wholesalers at the very place where the fish is unloaded (90 per cent of the women interviewed). In the majority of cases, the operation is covered by an agreement:i.e. the woman rents the boat to the fisherman who in return undertakes to sale her all his catch. Women wholesalers then distribute the fish on Lome markets. and upcountry.

Fish is sold fresh, smoked or dried. In general smoked fish is sold upcountry because of the difficulties in transport and refrigeration. Fish is stocked in baskets or in basins which constitute the measuring unit.

Drying

Drying is carried out immediately after the fresh fish is unloaded. Small fry such as sardines are washed at the beach whereas big ones are washed at home. The drying process takes about two days and the fish is exposed on the ground or on a heap of gravel, along the road or at the beach. When a long period of storage is anticipated, the drying time can take up to four days.

This traditional method of drying fish has many drawbacks. First, the fish has to be stored away every evening. Second, losses can be considerable. All the women interviewed (100 per cent) have reported important losses. All are caused by main or by strong waves that bury the fish into the sand. 10 women (25 per cent) had to discard the fish after it had started to rot. This was due to the bad quality of the fish which in many cases was purchased at an early stage of putrefication. There were two cases (5 per cent) where the fish had been crushed by passing vehicles.

When asked about improving their drying capacity, all the women interviewed (100 per cent) expressed their need to do so. Asked whether they know other drying methods, none seemed to know of any other way.

3.2 Fish smoking

In the area under review, i.e. the gulf and lakes districts, women carry out the drying, pre-smoking and smoking operations (100 per cent of people interviewed). The use the traditional method which is practiced throughout the region. The results vary, depending mostly on the quality of the fish. Smoking time varies between eight to 48 hours depending on the desired period of conservation.

Drying is necessary to eliminate part of the humidity before the smoking process. The equipment most commonly used consists in two oil drums whose upper and lower lids have been removed. The fire is made in a small cement chamber built under the open end of the oven. The fish is scattered over a metallic net, in simple and spaced layers so that the fish does not stick together. All the women interviewed declared to ignore any other method for smoking fish. They also wish, with one exception to improve their smoking capacity if they could afford it.

Losses occurring during the smoking stage also vary the same way as in the drying process. For the 40 persons interviewed in the maritime region, the loss account for about 1.2 per cent. They increase when the quality of the fish is poor or when the fish is at an early stage of putrefaction.

3.3 Storage of the fish

Generally speaking, the women do not possess refrigerator ıor any similar appliance for keeping fresh fish. As a result, the losses are always substantial although the fish remaining unsold is for most part smoked.

The smoked fish is stored in baskets (39 cases out of 40) and the period of conservation varies from a few days to more than a month. The results of the survey carried out on a 40 women sample show the following variations in the length of time the fish remains stored:

- from 1 to 3 days : 11 answers
- up to 7 days : 13 answers
- up to 1 months : 4 answers
- up to 3 months : 6 answers

Although no information was available on losses occurring during the conservation period, all indications are that they do occur and are due to mouldiness when the conditions are unfavourable.

The dried fish is kept in baskets (100 per cent of the answers) either in a barn (9 out of 40 cases), either in the kitchen (18 cases) or in a room (7 cases). In five cases, the dried fish was kept in a special store and one women kept it outside under a canvas net. Dried fish is stored much longer than smoked fish. The period varies from three days to more than three months.

4. Yam

4.1 Harvest

The harvest is carried out by the women themselves (91.8 per cent) with the assistance of the rest of the family. In four cases, i.e. 8.16 per cent. the harvest was carried out by the husband and the children. In the majority of cases the whole family is involved in the harvest of yam. Paid workers are seldom used. This was the case in only 6.1 per cent of the people interviewed.

Harvesting time varies from one person to another; it can last two days in some cases and 14 days in others. However, the majority of the people interviewed harvest their yam in less than five days (73.5 per cent).

4.2 Storage

Most of the time, yam is not stored. It is a very perishable crop with serious conservation problems. Among the 138 people of the sample, 32 or 23.19 per cent did not stock the yam after harvest. Of the 78.19 per cent who did store their harvest, 63.70 per cent kept the yam at the field and 14.49 per cent at home. This is possibly due to the fragility of fresh tubers and the weight of the harvest.

The yam is stored for a period varying from one to six months. 6 6.1 per cent keep it for less than a month i.e. from seven to 16 days. The average storing period is two and half to three months.

4.3 Transportation

The harvest is carried manually from the field to the house (100 per cent of the persons interviewed).

However 12 producers carried their harvest to the market in a lorry while three more used paid porters.

Transport costs are relatively low. They vary from one to three CFA francs per kilo if a lorry is used and one to five CFA francs in the case of porters.

4.4 Marketing

In most cases the yam is sold at the market and on a retail basis. Out of 138 women producers interviewed, 45 or 32.61 per cent of the sample did not sell their harvest and 13 sold their produce to wholesalers. The markets are situated at variable distances from the farms. The nearest market was at 100 metres and the farthest at 27 km.

Yam waste and losses

The species that are cultivated are all local. Part of the losses that were observed were due to dead or destroyed cuttings during growth. The percentage of empty mounds at harvest varies from one to 8 per cent of all the mounds planted. Losses due to rot and to rodents were also observed.

During storage, the most important losses were due to rodents. No figures were available but losses were reported by 62 farmers out of the 106 who had stocked the tubers after harvest. Heat also caused losses in stored yam (46 cases) but no loss by rot was observed.

No losses during transport were reported whether at the field or between the house and the market.

At the marketing level, only six people out of the 94 who sold their products incurred losses and these were due to cracks caused by manipulation.

5. Sorghum

5.1 Harvesting is done manually with a machete and a knife. This is also an operation where women are fully involved (94.64 per cent of the women in the sample have taken part). In 89.3 per cent of cases, the husband took part in the operation and the children in 64.3 per cent of the sample were also involved. It seems that the harvest is carried out entirely by the family with no outside help.

Harvesting usually takes a day or two but it can be extended from one to 14 days depending on the size of the farm and the number of people taking part in the operation.

Family consumption is the primary destination of the harvest (49.6 per cent of the quantity produced). 6.2 per cent of the harvest is kept aside as future seeds. The surplus, which is slightly lower than the quantity consumed, is sold on the market (44.2 of the total harvest).

5.2 Threshing and hulling

After harvesting, the panicles are gathered on a drying area and undergo an additional drying period of 5 to 6 days before threshing. This is a 100 per cent manual operation and the threshing is done at home in most cases (80.3 per cent of the sample) or in the field (21.4 per cent).

The ears are generally crushed with a stick. This is a painful process, slow and time-consuming. It is done by women in most cases but the rest of the household (husband, children) participate sometimes.

5.3 Storage

Sorghum is usually stored in granaries but some women store it in jute-bags. It can also be kept in ear bundles and left in heaps in a room. The granaries are made of bamboo sticks and a thatched roof. Sometimes they are made of mud or clay and covered with bunches of straw to protect the walls from the sun or from rain. The detachable roof can be lifted for access to the inside. Other shapes were also observed. Those were described as made of "four pieces of wood in the shape of an open air kitchen under which fire is made". This method is referred to as the fumigation method.

5.4 Transportation

In most cases, the grains are carried by humans. Only three cases were reported where transport was done by lorry. This concerned more important quantities varying from 200 to 2000 kg at a time. Transport by bicycle was also observed.

Transport costs by truck vary between one and seven CFA francs per kilo. Paid porters are an exception and in that case the cost varies between one and nine CFA francs per kilo.

5.5 Marketing and distribution

Out of 56 persons interviewed, 33 or 58.9 per cent of the sample sold all or part of their harvest, the remaining 41 per cent produced just enough for their own consumption and for seeds.

The quantities intended for sale are usually carried to the market and sold to retailers. It was observed that not a single woman farmer had sold her production to Togo-grain which is the State owned body responsible for storing and distribution of grain. Sorghum is also to wholesalers (24.24 per cent).

Sales are spread over six months after harvesting. No sales take place beyond that period.

Waste and losses

Pre-harvest losses are relatively important and are usually due to barren stalks and rotten panicles. The loss incurred through stalk sterility varies much from a farmer to another (0.7 to 17 per cent); it was reported in 62.5 per cent of cases.

The rotten panicles also account for a substantial part of reported pre-harvest losses. They were observed in 44.6 per cent of cases and they usually amount to 0.9 per cent of the total harvest.

Losses of grain during the drying period are limited. Losses due to birds were reported in six cases and these were estimated at 0.1 per cent of the harvest. In general, sorghum is perfectly dry at harvest and the additional drying period is an additional precaution taken by the farmer to have a longer storage period.

Losses occuring during threshing are variable. They vary from 0 per cent to 5 per cent. Some abnormally high percentages were observed (4.5 per cent). They could be attributed either to errors of appreciation in the survey or to grain buried in the ground in the case of threshing done on the ground.

No losses were reported during the hulling process. However, losses can be expected during the fanning that follows threshing.

Losses reported during storage are mostly due to rodents and insects. They account for 0.49 per cent of the harvest garnered. Losses due to mould were only reported in two cases and they amount to 0.2 per cent of the grain lost.

Losses during distribution are very rare. They were reported only in seven cases (21.2 per cent of people who sold their product) and they are generally negligible. In only one case losses amounted to 0.5 per cent of the sales.

6. Rice

There are two types of rice growing in Togo: in the highlands on most of the territory and irrigated fields in the river basins. In the highlands where the survey was carried out, the rice is generally grown in open fields and rainfed.

6.1 Harvesting

Mowing is always done manually with a sickle or with knives. Machets are also used at times.

Sheafs are reaped and they are left to dry for three to four days at the field.

All women farmers harvest the rice themselves, usually with the help of the rest of the family. Only in eight cases or 9.1 per cent, the women carried out harvest alone. The use of paid workers is rare and was reported only in 6.8 per cent of cases. The harvest is first used for family consumption (approximately 49.1 per cent of the production). Seeds account for 31.9 per cent of the harvest and the remaining 19 per cent are sold on the market.

6.2 Threshing

Threshing is a long and arduous manual task generally carried out in the field (four women farmers threshed their paddy in another place). Men usually take part in the operation.

6.3 Dehusking

This consists in clearing paddy from all husks and the external caryopsis layers. In the area under review, the majority of farmers (86.4 per cent) carry it out manually with pestle and mortar. It is a particularly long and arduous process entirely carried out by women. Mechanical dehusking was used by 13.6 per cent of the sample. The type of machinery used was not indicated during the survey.

6.4 Storage

Paddy is always stored at home and never in the field. The harvest is usually stored in jute bags inside the house or in closed granaries. In some rare cases clay pots were used (3.4 per cent of the sample).

6.5 Drying

To ensure good preservation, drying before threshing and storage is often necessary. The unthreshed paddy is usually sun-dryed on the field and the sheafs are left on the ground for a few days.

After threshing, the paddy is dryed before dehusking or over-dryed. It is usually sun-dryed near the house. The paddy is spread in thin layers on a hard and even surface for up to 15 days. 22.7 per cent of the farmers in the sample used cemented areas.

6.6 Rice par-boiling

Par-boiling or partial cooking is done in three different stages:

- soaking in cold water
- steaming
- sun-drying until the rate of humidity is reduced to around 14 per cent.

The process has great advantages although it entails additional work and more fuel. The traditional par-boiling methods vary from a country to another. No accurate information is available on the method used in Togo. The survey did not cover this practice since it is not yet very c common.

Waste and losses

Losses reported during the drying period are relatively minimal and are mostly due to rodents. Apparently, birds and insects do not affect the paddy left to dry.

During manual threshing a certain percentage of the grain is left buried in the ground. Two third of the women farmers reported losses during threshing and these vary from 0.05 to 5 per cent of the harvest.

Dehusking by pestle and mortar is the most common method but it has the disadvantage of resulting in a high percentage of broken grain. 44.8 per cent of the farmers reported losses during the process but the causes were not indicated.

Losses during storage are rare and in the case of rice they are limited. They are due to rodents, losses due to mould were reported by only two producers.

PART V. Projects and programmes for the reduction of food losses in Togo

Post-harvest losses result from inadequate handling, processing and conservation methods used by the farmers. Currently, FAO is providing assistance to Togo in the prevention of food losses and plans to launch a programme for improving the farmers' storage methods.

5.(a) Organisations and national institutions in charge of processing, conservation and storage of agricultural products

(i) Plant protection services (SPV)

The plant protection service is under the Ministry of rural development. The activities in the prevention of food losses were launched in 1975 and mostly related to research and diffusion of improved storage and conservation methods together with efficient pesticides. The programme covers the maritime and savannah regions.

The results of the research are communicated in the form of recommendations to development projects and to advisory bodies in the general directorate of rural development which then transmit them to the farmers.

(ii) The Institute for Tropical Food and Agricultural Research (IRAT)

In the area of food crops the activities of IRAT concern:

- Selection of plant material;
- fertilisation (deficiency diagnosis and manuring formula)
- agricultural techniques and studies on herbicides, crop rotation
- preservation of stored commodities.

Those activities consist in demonstrations and experiments in thee rural areas within the framework of food crop development projects.

In the area of food loss prevention, IRAT undertakes experiments on pesticides and improved storage techniques.

(iii) National tuber crops institute (INPT).

INPT is a tuber crops research organization under the Ministry of Rural Development. It was established in 1976 and its objective is to promote the development, processing and preservation of tuber crops. Its main activities consist in an inventory of the various species and varieties of tuber crops in Togo, the introduction of species and varieties from neighbouring countries and their adaptation to local conditions. Its programme of activities includes cassava and yam and relates to mechanized gari manufacturing and yam preservation.

The institute carries out experiments on mechanized gari manufacturing, the objective being the establishment of a mobile unit which can be used by small communities and agricultural co-operatives. Research is also carried out on traditional methods with a view to alleviating women's tasks. The yam preservation programme is still at its beginning and it operates with the assistance of FAO since 1983. It includes, among others:

- a comparative study on the various preservation methods
- assessment of the storage aptitude of the different varieties
- a study on the influence of maturity at harvest on the storage aptitude
- effects of anti-fungus and anti-germination products on preservation
- studies on advanced preservation methods.

(iv) Directorate of nutrition and food technology

The directorate of nutrition and food technology, under the Ministry of Rural Development is engaged in research for processing and preservation of agricultural products including fruits, vegetables and cereals. One of the objectives of the directorate is the fight against food losses and waste.

The objectives of the research undertaken by the directorate can be summarized as follows:

- development of simple methods for processing and preservation of fruits and vegetables intended for mass consumption
- promote the consumption of local foodstuffs

- improvement of existing traditional techniques
- introduction of new technology.

Its programme for 1984-1986 concerns cereals (mostly maize and sorghum), tuber crops (cassava, yam) fruits and vegetables and pulses (groundnuts). Projects are under way for a study on the culinary and technological quality of the cereals disseminated throughout the country. In that context, maize couscous was experimented. The demonstrations are carried out during training sessions organized through the Ministry of Social Affairs, the Directorate of the Status of Women or the Ministry of Health. In the area of applied nutrition, the directorate has carried out an inventory of recipes used in national dishes.

The programme of action of the Directorate of Nutrition and Food Technology covers the country as a whole and it reaches both the rural and the urban populations.

(v) Togograin

Togograin is an organization concentrating on marketing. As such it has no specific programme for the reduction or the prevention of food loss in the rural area.

5.(b) FAO projects on food loss prevention in Togo

The FAO programme of action for food loss prevention was established of the Government of Togo, has undertaken four projects intended to limit or to prevent post-harvest losses at the farmer's level through improved storage.

The first of those projects bearing reference No PFL/TOG/001 has to do with the improvement of storage and dehusking of rice, within the framework of the maritime region development programme (PRODERMA). The Ministry of Rural Development is the executing body and the project is jointly financed by the Government of Togo, the ACF and IDA (IBRD). PRODERMA covers the entire maritime region. The objective of the FAO project is to support the action of PRODERMA in the area of paddy drying and processing and storage of cereals within pre-co-operative associations. The project covers the following areas:

- construction of three drying and storage areas for paddy
- provision of three paddy dehusking and polishing units and small generators.

The second FAO project for food loss prevention in Togo is within the project of the integrated development programme for Northern Togo, Kara Section commonly known as North Togo. The activities of the North Togo project are aimed at farmers exclusively and their purposes to increase agricultural output over the areas under cultivation, the intensive exploitation of uncultivated land and livestock development. Project FAO PFL/TOG/002 entitled: "Improvement of Harvest Storage and Dehusking" aims at assisting the North Togo project in developing simple but efficient preservation, marketing and processing methods.

Different types of silos and treatment products were experimented in the project. The experiments concerned adobe silos (local type) ceme cement silos (cacavelli type) and plaited straw silos which are five times more expensive than those in adobe. The losses are more important because of poor porosity of the sides and the impossibility to ventilate the stored grain, which results in rot. Among the achievements of the project, we can mention the construction of four storage and processing units including a warehouse at the operational base of the project where seeds intended for farmers covered by the project and for other organisations in the region are packed and stored. The construction, with the help of the farmers of concrete threshing surfaces for large farms, the use of canvas (polyane canvas) for isolated and small farms, the construction of a covered drying are in the Sala-landa Pogenda irrigated perimeter.

The project has also resulted in the delivery of packing and processing equipment installed either at the project headquarters (laboratory equipment and seed packaging gear) or used in the three zones of the project (fumigation canvas, gas masks, sprayers).

Project PFL/TOG/003 entitled: Prevention of Post-harvest Losses" at the farmers' level should make it possible to strengthen and co-ordinate all efforts and activities undertaken to reduce the losses at the level of the farmer and to formulate a national programme for improving storage methods for farmers.

The project is now in the conception stage and will cover the whole country. It should be completed by end 1984. Experiments on the use of pesticides are carried out through sampling in the farms. Further research is carried out on storage methods (Crib, Benin Granery).

The fourth FAO project under way in Togo in the context of its food loss prevention programme aims at improving yam storage. The objective of the the project, which consists in assistance to INPT, is to launch a comparison campaign on traditional yam storage methods in Togo and to assess the aptitude to storage of the main existing varieties. Among the other activities of the project, we can metnion the preparation of a project document for a programme of selected yam and cassava plant production as well as other tubers, with a view to disseminating them among

farmers; it also includes a study or the establishment of small processing units. The Government's contribution to the project consists in providing the necessary personnel for the supervision and the implementation of construction works as well as construction materials that are not supplied by FAO.

Conclusion and recommendations

In Togo, whatever the ethnic group, the model of the extended family is dominant. Polygamy is very common and this expands the household living on the family plot. The family also includes the father, one or several wives and their children, the latter being a source of wealth for the famer since they provide labour force for the family and old age insurance. Polygamy is considered as a source of wealth.

The division of labour by sex seems quite well defined. The principle, the wife does not own land since it is inherited through the patrilinear lineage. It is therefore up to the husband to provide her with a plot on his own field where she can grow food-crops both for consumption and a surplus for sale.

The husband is the head of the family and all decisions concerning the household and the exploitation of the land must be referred to him. In the case of maize for instance the quasi-totality of the women interviewed confirmed that the product of the sale of maize goes to the husband.

Women's access to agricultural credit seems to be hampered by problems. As an example, land ownership is required as a guarantee for a loan as well as membership to an association or a co-operative. The fact is that Togolese women are very individualized.

The survey carried out in the maritime region and in the highlands and which covered 930 women farmers has highlighted the predominant role of Togolese women in the production and distribution of agricultural and food crops. Women account for 90 per cent of all harvesting and post-harvest operations for the main food crops except yam which is considered as the husbans's realm. Small scale fishing is entirely in the hands of women.

Women can handle all these operations but in most cases she is assisted by her family and/or other persons. The use of paid workers is rare.

The means and methods used for post-harvest operations are still traditional which means long and ardous tasks for women. The level of mechanization is very low and almost all oeprations, with the exception of maize grain grinding are done manually with a simple tool. The use of pesticides both in harvest-production and preservation is limited to a small number of farms.

The survey has also revealed that storage structures commonly used by families are relatively adapted to the environment and don't result in serious problems.

Damage to stored crops seem to result from infections in the field which are compounded by predators during storage.

The totality of women farmers interviewed have reported product losses at least during one stage of the post-harvest process. Although the amounts of those losses vary from a crop to another, all women agree that the most significant losses occurred during storage and that these were due to rodents and fungi.

During threshing, dehusking or shelling of cereals, the percentage of broken or damanged grain or those buried in the ground can sometimes be high. During open air drying birds can cause some losses but these are minimal; however inadequate drying results in high losses due to mould and rot during storage. In some cases they result from bad handling but in this case they remain low.

Concerning fish, losses are much more significant. They could be attributed to the inadequacy of conservation methods and to processing techniques that are not always appropriate.

As a conclusion it is important to note that the survey which was undertaken in the framework of this study concentrated on post-harvest operations carried out by women. However, according to information received from the women farmers themselves and other national technical officials, important losses occur before and during harvesting.

There are also important divergences between the estimations made by the technical services and national institutions on the one hand and the results of the survey on the other. The results of the survey being considerably lower. This could find an explantion in the fact that the last production campaign covered by the survey has benefitted from climatic conditions particularly favourable for crop drying thus considerably minimizing the damange caused by insects and mould. Furthermore, the quantities handled and stored by women producers are generally small and they make sure that every grain is picked thus limiting losses and waste.

Recommendations

A number of projects and programmes are currently under preparation or are being implemented in Togo in the area of food losses. FAO brings its contribution mostly in the improvement of storage of cereals in particular.

The recomendations of the present study will therefore be divided in two parts: consolidation and strengthening of current projects and programmes and the initiation of new specific actions.

A. Consolidation and strengthening of existing structures and insitutions

1. Co-operation between services and institutions and co-ordination, at the national level of research, dissemination and procurement activities in food losses prevention.

It has been observed that a certain amount of autonomy prevails in the services and institutions engaged in activities geared towards the prevention or the reduction of food losses. The farmers are therefore somehow confused. It is highly desirable that the parties concerned pool their efforts and co-ordinate their activities in order to avoid any possible duplication and also to ensure maximum efficiency in putting into effect the results of research to farmers' production methods.

2. Strengthening agricultural extension services and reorientation of their programmes in order to meet women's specific needs more adequately.

3. Setting up, at the national level of a supply system in agricultural inputs (fertilizers, phyto-sanitary products).

4. Integration of women in current or planned projects and programmes on food loss prevention efforts will have to be made so that women take direct advantage of the activities carried out in the context of those projects.

5. Training of women extension workers.

There is no doubt that contact is made easier between women and that the specific needs of women are better understood by the women themselves.

6. Strengthening of the Directorate of Women's Affairs both in qualified personnel and financial resources.

The activities of the Directorate of Women's Affairs are mainly oriented towards increasing women's productivity through associations. The problem of food loss is one of its concern. However, due to lack of financial and human resources, its activities in this field are limited to braining who in turn can train the masses.

B. Specific action

The specific action recommended in this study relates to cassava (manufacture of gari) and fishing.

1. A study on the impact of technological innovations on rural women in Togo; case study on semi-mechanized gari manufacturing.

The study will focus on semi-mechanized gari manufacturing but will also identify technological and institutionsl innovations which would contribute to the improvement of socio-economic well-being of rural women in general or a sample group in particualr.

2. National seminar on techniques relating to fish processing, conv conserawation and distribution.

Project fact sheet

Title: National seminar on techniques relating to fish processing, conservation and distribution.

Country: Togo

Duration: One month

Proposed starting date: June 1985

Organization: ECA/FAO/GOVERNMENT of Togo

Departments and Government Institutions Concerned: Ministry of Rural Development, Ministry of Social Affairs and the Status of Women, Ministry of Planning.

Estimated cost: US$50,000

Objectives of the seminar: The Development Objectives will be mainly:

- The improvement of the nutrition status of the populations concerned through a better protein distribution throughout the year.
- The increase in fishermen's income by reducing fish losses.
- Ensure that the supply of fish is continuous through a better conservation and distribution system.

The immediate objectives are as follows:

- Review and evaluate the production, processing and conservation system, the distribution and consumption of fish in Togo.
- Identify and evaluate the traditional fish conservation, drying and smoking techniques in Togo.
- Evaluate fish losses after and during the various production stages until consumption.
- Training in improved drying and smoking techniques.

Justification of the project

In most tropical countries and in West Africa in particular, fish is one of the most important and cheapest sources of animal protein for many people. In Togo, almost 90 per cent of the families consume fish regularly both as an eating habit and because it is cheaper than meat. Fish production traditional methods satisfies most local requirements although the output is low. In Togo, fishing has remained traditional in spite of efforts at industrilization and the sector is entirely controled by women who carry out the distribution and processing of almost the entire fish production.

In spite of their potential, national production are relatively low and the country is increasingly relying on imports of frozen fish. However, although the supply is at times plentiful, the product does not always reach the consumer in view of the abundant losses resulting from inadequate handling and conservation methods.

In some tropical countries and in regions where fish is abundant, drying and smoking are the most economical methods for extending the conservation period while keeping its favour. A position of the total catch is smoked.

In order to find a solution to the problem of fish losses, there are many conservation including the use of refrigeration and congelation. But Togolese women, like in most developing countries are not capable of purchasing that type of expensive equipment. Therefore, an improvement of traditional methods (drying, smoking, brine) better adapted to the possibilities and the needs of the local population is best indicated and can have better impact on fish production.

Annex

Methodology and organization of the survey on food losses

The survey on food losses incurred by women farmers in Togo was carried out on the basis of a two phase sampling method coverigg mainly villages and farm households. The main objectives of the survey were to assess the technology used by the women and food losses resulting from the use of those techniques. The sampling unit, i.e. the person interviewed in the household was the wife and not the head of the household himself. .In households with several wives, the priority was given to the first wife out of deference for her. Whenever possible, the interview was carried out in the presence of the head of the household.

Area of the survey and crops covered

The Togolese territory is divided into five administrative regions, supervised by local development organisations having specific agricultural purposes.

- The maritime region;
- The central region;
- The Kara region;
- The highlands region;
- The savannah region.

The country is divided into two climatic regions: in the South a semi-humid tropical zone with two rainy seasons, in the North, a sub-Sudanese zone with one rainy season.

The maritime region and the highlands region were selected for the survey for a double reason: on the one hand, both regions belong to the semi-humid tropical zone where conservation problems are more acute and most of the food crops cultivated in Togo belong to those regions.

The products covered by the survey were:

- maize, cassava and fish in the maritime region;
- maize, rice, sorghum and yam in the highlands.

Those crops were selected because of their predominance in the eating habits of the Togolese population.

The sample

The selection of the sample was deliberate and was motivated by the following criteria: the cost of the operation, the interviewers available to carry out the operation in the field and the presence of a basis for sampling constituted by the general agricultural census (RGA) undertaken in 1982/83. For practical reasons the sample used for RGA was also used as sampling basis for the survey on women's food losses. RGA

used 185 villages in the maritime region and 175 in the highlan The number of people interviewed varies according to each crop and its importance in the eating habits of the Togolese. The total sample consists of 931 women farmers distributed according to the table below, by crop and by region:

Number of women farmers interviewed

Crop	Maritime region	Highlands	Total
Maize	230	149	379
Cassava	230	-	230
Yam	-	138	138
Rice	-	88	88
Sorghum	-	56	56
Fish	40	-	40
Total	500	431	931

Interviewers and questionnaires

The Directorate of agricultural surveys and statistics (Direction des enquêtes et statistiques) in the Ministry of Rural Development provided the staff required for the two regions covered by the survey:

- 24 interviewers
- 4 supervisors (agricultural engineers)
- 10 data processors

The interviewers were given a two-day training to familiarize them with the questionnaire and the objectives of the survey. Checks on the field were also carried out during the survey.

Six questionnaires were used for the survey, one for each crop (maize, cassava, rice sorghum, yeam, fish). All were designed on the same model but adapted to suit the specific crop. Each questionnaire includes, on the hand, questions on the method used for each operation from harvest, to marketing including processing, conservation, transport and estimations on losses resulting from the techniques used and the nature, the importance and causes of those losses.

Methodology used for the general agricultural causes (RGA) in Togo (1982-1983)

The census was carried out in the form of a random sampling survey covering the whole country both in geographical terms and in the nature of the information sought. The whole territory was covered, with the exception of the communes of Lome. Aneho, Tsevie, Kpalime, Atapkpame, Sokode, Bassar and Kara.

All traditional farms were covered the only criteria being that at least one plot, whatever the size, had been cultivated during 1982. No limit was set for the area of the field and all agricultural households were considered as farmers.

Sampling plan

The sampling plan used by the RGA is a two phase process. The primary units (PU) are villages or the like. They are drawn on a random basis with unequal probability proportional to their population, from the list of the general population census (RGPA).

The secondary units (S.V) are constituted by farms or house agricultural households. The number of agriculture households used varies from 5, 10 and 15 depending on whether the village sample was drawn once, twice or three times.

Draw of primary units

In order to have a good drawing basis, the list received from the general population census (RGPA) was reviewed and checked on the field because RGPA had used, as statistical units, different counting areas different from the villages and they had to be reconstituted in many cases. The strata are made of the districts (prefectures) and sub-strata were created for localities where the number of farmers exceeds 1,000 or where the population exceeds 5,000.

The primary units were drawn independently in each stratum, in the following manner:

(i) for each stratum, villages were aligned in random order irrespective of the number of the population;

(ii) the population figures are cumulated by going through the list from beginning to end. The final cumulative figure corresponds to the total population of the stratum, or (M);

(iii) (n) being the number of villages to be drawn from the stratum, the ratio:

$\frac{M}{n} = L$ called "drawing factor" (pas de tirage). Then a number is chosen at Random between 1 and L, or X_1;

(iv) The following arithmetic series is then constituted:
X_1, X_2, X_4 with $X_2 = X_1 + L$; $X_3 = X_1 + 2L$ .... and
$X_n = X_1 + (n - 1) L$;

(v) Each number in the series relates to a sample unit. The probability that a village having an M population is included in the sample equals $\frac{M}{L} = \frac{nM}{M}$. The draw is done by replacement.

Drawing secondary units

A list of agricultural households was established in every primary unit to serve as the basis for drawing the secondary units. These were drawn at random with the same probability and without replacement.

Calculation of extrapolation rates

For each primary unit, an extrapolation rate being the converse of the probability of that unit of being drawn was calculated.

Thus, the following formula represents the first degree extrapolation rate for village i:

$$T_1 i = \frac{M}{Mi\ n}$$

The second degree rate was calculated as follows:

$T_2 i = \frac{Mi}{m_i}$, Mi being the total number of agricultural households of the i unit and m_i the number of sample households.

The general extrapolation rate, which is the product of the first and second degree extrapolation rates, was calculated by the formula:

$$T = \frac{M}{M_i x n} \times \frac{Mi}{m_i} \text{ or } \frac{M}{nx\ m_i}$$

For a given Y characteristic, the estimation for the stratum as a whole is:

$$Y = \frac{M}{n \times m_i} \sum_{i=1}^{n} \sum_{j=1}^{m_i} y_{i\ j}$$

which is a unbiased estimator of **y**.

Table I: Total population, agricultural population and active popualtion in Togo ('000)

Year	Population			Economically active population		
	Total	Agriculture	% Agriculture	Total	in Agriculture	% in Agriculture
1970	2 020	1 481	73.3	885	649	73.3
1975	2 290	1 619	70.7	971	686	70.7
1980	2 625	1 780	67.8	1 077	731	67.9
1981	2 705	1 820	67.3	1 104	742	67.3
1982	2 788	1 859	66.7	1 131	754	66.7

Source: FAO, Production Yearbook, 1982.

Table 2: Trends in agricultural output (agricultural livestock and fisheries products)

Unit : 1 000 tons

	1977	1978	1979	1980	1981	1982
Total cereals	323	253	317	311	271	302
Roots (total)	861	868	950	959	1 002	1 029
Pulses (total)	22	22	24	24	21	22
Oil seeds	89	78	101	113	110	118
Total meat	17	21	23	24	25	26
Total milk	3	3	3	3	4	4
Cattle (1000 heads)	194	217	221	230	240	250
Sheep (1000 heads)	619	823	800	810	820	835
Goat (1000 heads)	547	739	700	720	750	750
Pigs (1000 heads	195	256	310	328	348	
Yam	290	403	483	482	505	520
Cassava	550	437	443	450	470	480
Maize	182	125	159	154	137	150
Millet	123	110	136	128	107	125
Vegetables	47	52	60	61	62	65
Cocoa beans	28	18	14	16	16	16
Palm oil	17	18	19	20	20	22

Source: FAO Economic and Social Policy Department - Basic Facts on the Agricultural Sector.

Table 3: Indicators on food and agricultural production (1974-1976 = 100)

	1977	1978	1979	1980	1981	1982
Food production	99.89	114.63	116.72	119.46	118.29	124.96
Agricultural production	100.01	112.87	115.84	119.96	118.43	125.83
Crops	98.19	112.10	114.70	118.12	114.90	122.67
Livestock	111.90	117.33	122.55	129.79	138.17	143.39
Per capita food production	94.86	105.92	104.86	104.29	100.18	102.72
Per capita agricultural production	94.99	104.30	104.06	104.73	100.34	103.43
Crops per capita	93.25	103.57	103.04	103.11	97.33	100.83
Livestock products per capita	106.29	108.45	110.11	113.32	117.08	117.88
Cereals per capita	87.86	120.32	112.14	107.60	90.68	98.28

Source: FAO Production Yearbook 1982

Table 4: Food supply

	1966-68	1969-71	1975-77	1978-80
1. Calories per person per day				
Total	2 213	2 194	2 015	2 106
Vegetable products	2 133	2 119	1 935	2 029
Animal products	80	75	81	77
2. Proteins/pers/day/ grammes	47.6	47.2	45.8	46.5
Vegetable products	40.5	40.2	38.3	39.5
Animal products	7.1	7.0	7.6	6.9
3. Lipids/pers/day/ grammes	33.2	32.3	24.3	35.4
Vegetable products	28.0	27.6	29.1	30.3
Animal products	5.3	4.8	5.2	5.1

Table 5: Trade in agricultural products

	Unit	1980	1981	1982
1. Imports				
Cereals	MT	40 820	60 999	60 780
Rice	MT	18 750	40 256	38 778
Cattle	head			
Sheep and goats	head	8 000F	10 000F	10 000F
Fresh, refrigerated and frozen meat	MT	3 011	4 778	7 100
2. Exports				
Coffee	MT	9 020	10 105	9 549
Cocoa beans	MT	14 507	18 252	10 113
Cotton seeds	MT	7 841	11 273	13 453
Cotton fibres	MT	5 152	9 247	11 897

F = FAO estimates.

Source: FAO Trade Yearbook - 1982.

Table 6: Imports of fish products

Quantity (Q) = MT Value (V) = US$ 1000

		1978	1979	1980	1981
- Fresh, refrigerated or frozen fish					
	Q	6 846	6 846F	6 846F	6 846F
	V	2 234	2 366F	2 366F	2 366F
- Dryed, salted or smoked fish					
	Q	621	621F	621F	621F
	V	481	509F	509F	509F
- Fish products and tinned food					
	Q	385F	385F	385F	385F
	V	448F	474F	474F	474F

F = FAO estimates

Source: Fisheries' statistics, FAO

Table 7: Maize: Participation of the women farmers to harvest operations

	Maritime Region		Highlands region		Sample	
	Number of answers	%	Number answers	%	Number of answers	%
1. None participation of the women	34	14.78	3	2.01	37	9.71
2. The woman farmer alone	82	35.65	17	11.41	99	26.12
3. The women farmer with the household or other persons	113	49.14	129	86.57	242	63.9
4. No answer	1	0.43	0	0	1	0.26
5. Total interviewed	230	100.00	149	100.00	379	100.00

Table 8: Maize - Use of phytosanitary treatment

	Maritime region		Highlands		Sample	
	Number of answers	%	Number of answers	%	Number of answers	%
A. Before harvest						
- No treatment	220	95.65	148	99.33	368	79.09
- Use of treatment	10	4.35	1	0.67	11	2.91
Total interviewed	230	100.00	149	100.00	379	100.00
B. During storage						
- No treatment	186	80.86	145	97.31	331	87.33
- Use of treatment	44	19.14	4	2.69	48	12.67
Total interviewed	230	100.00	149	100.00	379	100.00

Table 9: Maize - Place and storage method

	Maritime region		Highlands		Sample	
	Number of answers	%	Number of answers	%	Number of answers	%
A. Place of storage						
- At the field	7	3.04	40	26.85	47	12.40
- At home	219	95.22	107	71.81	326	86.02
- No storage	4	1.74	2	1.34	6	1.58
Total interviewed	230	100.00	149	100.00	379	100.00
B. Storage method						
- Open air granary	135	58.70	102	68.46	237	62.53
- Jute bags	15	6.52	17	11.41	32	8.45
- Jars	5	2.18	-	-	5	1.32
- Basket	2	0.87	-	-	2	0.53
- Other	73	31.73	21	14.09	94	24.80
- No answer	-	-	9	6.04	9	2.37
Total interviewed	230	100.00	149	100.00	379	100.00

Table 10: Maize - Storage period

Storage period	Maritime region		Highlands		Sample	
	Number of answers	%	Number of answers	%	Number of answers	%
- Up to 3 months	117	50.86	45	30.20	162	42.74
- 3 to 6 months	103	44.79	81	54.36	184	48.55
- Over 6 months	5	2.17	21	14.10	26	6.86
- No answer	5	2.17	2	1.34	7	1.85
Total interviewed	230	100.00	149	100.00	379	100.00

Table 11: Maize - Marketing period

Period of harvest sale	Maritime region		Highlands		Sample	
	Number of answers	%	Number of answers	%	Number of answers	%
A. Sale of entire harvest						
- Immediately after harvest	20	8.70	0	0	20	5.28
- 3 months after harvest	120	52.17	29	19.46	149	39.31
- 6 months after harvest	25	10.87	48	32.22	73	19.26
- Over 6 months after harvest	3	1.30	12	8.05	15	3.96
B. Harvest sale by installments						
- from harvest	3	1.30	3	2.01	6	1.58
- from 3 months	3	1.30	9	6.04	12	3.17
- from 6 months	0	0	7	4.70	7	1.85
C. No answer	56	24.36	41	27.52	97	25.59
Total interviewed	230	100.00	149	100.00	379	100.00

Table 12: Cassava - Plot Tenure

Maritime Region			
	Mode of development	Number of answers	%
1.			
1.	Full property with or without title	128	55.65
2.	Tenancy with cash payments	20	8.70
3.	Tenancy with payments in kind	2	0.87
4.	Loan	21	9.13
5.	Customary allocation	43	18.70
6.	Bailment	13	5.65
7.	Tenancy with cash and kind payments	2	0.43
8.	Others	2	0.87
	Total interviewed	230	100.00

Table 13 - Cassava - Peeling: Participation of women in the operation

Maritime Region			
		Number of answers	%
1.	The woman farmer carries the operation out alone	73	31.74
2.	With the help of the household and/or other persons	153	66.52
3.	The women farmer does not take part	4	1.74
	Total interviewed	230	100.00
4.	The husband takes part in the operation	32	13.91
5.	Use of paid workers	12	5.22

Table 14 - Cassava - Place and method of pressing

Maritime Region								
Place	Field		House		Other		Total	
Method	Number of answers	%	Number of answers	%	Number of answers	%	Number of answers	%
Manual	54	23.48	151	65.65	1	0.44	206	89.57
Mechanical	9	3.91	15	6.52	-	-	24	10.43
Total	63	27.39	166	72.17	1	0.44	230	100.00

Table 15: Cassava - Pounding period

Period	MARITIME REGION Number of answers	%
1. One day	53	23.04
2. One and half days	6	2.61
3. Two days	135	58.70
4. Three days	28	12.17
5. No answer	8	3.48
Total interviewed	230	100.00

Table 16: Cassava - Place of sale - Gari

Place of sale	Number of answers	%
1. Field	3	1.30
2. Home	7	3.04
3. Market	111	48.27
4. Other	5	2.17
5. Home-Market-Other	77	33.48
6. No answer	27	11.74

Table 17: Fish - Storage period for smoked and dried fish

Storage period	Dried Fish		Smoked Fish	
	Number of answers	%	Number of answers	%
1. One to three days	5	12.5	11	27.5
2. Four to seven days	13	32.5	13	32.5
3. Eight to one months	4	10.0	4	10.0
4. One to two months	5	12.5		
5. Over two months to three months	6	15.0	6	15.0
6. Three to six months	7	17.5	6	15.0
Total interviewed	40	100.0		

Table 18: Fish - Source of capital for financing the operations

Source of capital	Number of answers	%
1. Maize	2	5.00
2. Money lender	19	47.50
3. Credit purchase	10	25.00
4. Personal savings	9	22.50
Total interviewed	40	100.00