# The Role of Women in Providing and Improving Household Food Security in Sudan: Implications for Reducing Hunger and Malnutrition

By Fatma Osman Ibnouf[1]

**Abstract**

Relevant and consistent with the recent growing interest to assess the contribution of women to economic activities in Sudan, this study seeks to assess women's contribution to their household food supply and nutrition status in rural Sudan. As for the contribution of the research, the research is expected to contribute to improve the understanding of the important contribution of women to economic activities and in particular in providing and improving household food security in Sudan and thus valuing the potential role of women in reducing hunger and malnutrition.

Agricultural production (farm and livestock products) with supplemental resources (processed and preserved food items) and substitute resources (forest trees and wild food products) represent the available resources for the household food consumption in rural Sudan. Income generating activities along with other possible income sources (cash crops, trees products, pension, assets, remittance from migrants, and savings sources) provide household with income to afford foods. The finding of this study implies that in most rural areas in Sudan women are more capable than men in terms of the ability to use and allocate the available resources for the purpose to improve food security for their families.

For the purpose of this paper, improvement of the household food security refers to the expanding availability and accessibility of nutritional food on sustainable basis. In this regard this study has indicated that women in rural Sudan play a crucial role in improving their household food security, as they contribute to food production, enhance dietary quality and consumption diversity. Therefore, based on the findings in this paper, the major policy implication is that crucial role of women in this context can greatly be enhanced through adoption of supportive national and local development policy.

*Keywords*: Sudan, Sub-Saharan Africa (SSA), Women, Household Food Security.

**Abbreviations:**

| | |
|---|---|
| CPA | Comprehensive Peace Agreement |
| DPA | Darfur Peace Agreement |
| FAO | Food and Agriculture Organization |
| FHH | Female Headed Household |
| IFPRI | International Food Policy Research Institute |
| MHH | Male Headed Household |
| SSA | Sub-Saharan Africa |

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## Introduction

The Sudan is the largest country in Africa, with the area of 2.5 million square kilometers. Sudan occupies the north–eastern corner of Africa, lying between latitude 4º N and 22.5º N and extends from longitude 22º E to longitude 38º E and it shares common borders with nine countries (Awadalla, 1999). The population of the Sudan is estimated to be between 32 and 34 million, some 70 percent of whom live in rural areas (IFPRI, 2006, p. 4). Women constitute about half of the population overall, but there are considerable differences among different parts of the Sudan. However, women make up the majority of people in rural areas of the Sudan due to rural–urban migration of males. Sudan is one of SSA, Middle East and also an Arabic country. However, it has much food production situation and women status of SSA, particularly in Western and Southern Regions of the Country. The majority of population in the Sudan and in SSA countries as well depends on agricultural activity as the main source of food and income. Agricultural production constitutes the main source of livelihood for more than 80 percent of the population in the Sudan.

Sudan is one of the wealthiest countries in Africa in terms of the natural resources. However, the country has failed to utilize these considerable resources to achieve sustainable development for its population this may be attributed to a number of interacting factors such as natural and socio-economic factors and tribal conflicts and civil wars. A Comprehensive Peace Agreement (CPA) was signed by the Sudanese Government and the Sudan People's Liberation Army on 9th of January 2005. Just as the southern Sudan's war seemed to be coming to an end, another war intensified in the Darfur region, Western Sudan in 2003. However, the Sudan government is exerting great efforts to achieve peace as a prerequisite for the realization of other development issues. Darfur Peace Agreement (DPA) signed by largest rebel faction Sudan People's Liberation Movement/Army and by the Government of Sudan in May 2006. The CPA and the DPA have both been seen as grounds for optimism about the future of food security in Sudan. Recently Sudan appears to be relatively close to attaining food self-sufficiency at a macro level, nevertheless there are disparities in sub–regional levels. The challenge now is achieving lasting peace for the whole Darfur Region and building comprehensive rehabilitation plan for people in post conflict stage.

In the Sudan there are three distinct agricultural sub–sectors: the irrigated; the mechanized rain–fed; and the traditional rain–fed. The importance of the Sudanese traditional rain–fed sector can be judged in that it occupies 90 percent of the rural population. On the basis of the literature review: in the traditional rain-fed sector, women have been found to play crucial roles in food production, rearing of small animals and in income generating activities. A closer analysis of the composition of Sudan's population shows that the rate of growth of males, who economically active in traditional agricultural sector was significantly slower than that of the females (0.24 and 0.14 for males and 0.26 and 0.24 for females, for the years 1971-1990 and 1991-1998, respectively (IMF, 2002 cited in Guvele, et al. 2003, p. 11). It has been stated that the participation of females in the traditional agricultural sector reaches 87 percent (Simsa'a, 1998, p. 142). What is less well acknowledged is the impact of this contribution on their household food security. There is a need to fill this gap in the research in order to valuing of women potential role in reducing hunger and malnutrition. Therefore, this study focuses on the role of women in providing and improving food security for household.

## The Objectives of the Study

The overall objective of this study is to assess women's role in providing and improving household food security in rural Sudan. In view of the general objectives the specific targets of the study are the following:

- Determine how women role in food production and in non-farm activities contribute to provision and improving household food security.
- To examine gender roles within households such as responsibility sharing, decision-making process and cultural practices which influence household food security.
- To derive from the results of the study some suggestions policies of what might be done to improve women's contribution to improve the household food security in the Sudan and SSA as well.

## Literature Review

Normally, for anyone food security depends not only on availability of sufficient food supply, but also on sustainability of permanent access to food (Sen, 1981; Thrupp and Megateli, 1999; Gladwin, et al. 2001). Women contribute to agricultural production, especially food production, more than has been generally recognized. The reality in most SSA countries is that more than 50 percent of the active female population works in agriculture, reaching 93 percent in Burkina Faso, 87 percent in Angola, 98 percent in Burundi, 96 percent in Malawi, and 92 percent in Mali and Tanzania (Sekitoleko, 2004, p. 92). Women's work in the agricultural sector often remains invisible because the products of their labor are for the largest part intended for household consumption and do not reach the market economy. The data from the Sudan indicate that rural women produce 60 to 70 percent of food production in most rural areas (Aldeshoni, 2005, p. 51).

In the Sudan, as in most SSA, has a growing number of female-headed households (FHH) resulting from increases of rural-urban migration of male due to drought, civil conflicts, and other socio-economic factors (Aredo, 1998). For instance, the civil war has caused profound demographic changes, with FHH reaching as high as 70 percent in Southern and Western Region of the Sudan (the war-affected areas) (Guvele, et al. 2003, p. 10).

Achieving food security refers to access by all people to safe and nutritious food in adequate quantities to meets their dietary needs and leads an active life (see Endnote 1). However, this in itself does not confer adequate nutrition. A person's nutritional status involves accessibility to resources for food and translating the food obtained into satisfactory nutritional levels. Therefore, food security is a situation in which both food supply and effective demand are sufficient to cover nutritional requirements (Mittal, 2006, p. 16). In the Sudan, as in most SSA countries, the share of agricultural production is not sufficient to provide for the needs of a family and it is contribution to family food security has clearly become insufficient to cover the basic needs. People in many rural areas of the Sudan apply multiple livelihood strategies to secure food for their households and undertake other activities to generate income in order to be able to feed their family. Empirical evidence from a variety of different locations suggests that rural households do indeed engage in multiple activities and rely on diversified income portfolios; for

instance in SSA, a range of 30–50 percent reliance on non-farm income sources is common (Ellis, 1999). The participation of women in rural non-farm activities is becoming increasingly significant for the rural economy. It estimated that more than 84 percent of women non-agricultural workers are informally employed compared with 63 percent of men (Blackden, et., al., 2006, p. 13).

In the Sudan and in other SSA women perform virtually all the tasks required for household food security, these include: gathering wood fuel, fetching water, grinding and pounding the grains, rearing and milking small animals, and processing and preserving vegetables, meats and fruits and also preparing food for their household members (Duggan, 1998, p. 103; Aldeshoni, 2005, p. 51).

To sum up, it is abundantly clear from many bodies of the research in SSA, as well in Sudan, that women are overburdened with food securing activities (Aldeshoni, 2005; Maxwell, 1999, p. 1948; Gittinger, et al. 1990 cited in Hyder, et al. 2005, p. 333).

**Methodology**

For this study a qualitative–quantitative approaches were used:

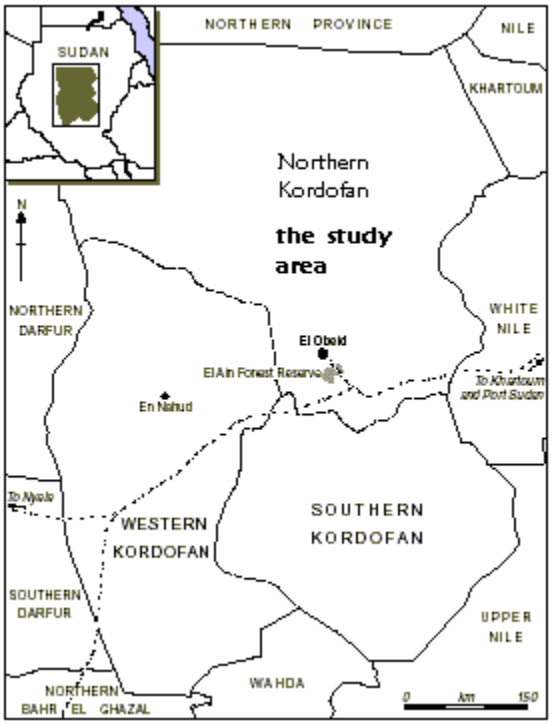
- To pursue the objectives of this study, field surveys were used to provide the primary data. The study was carried out in rural areas of western Sudan. A random stratified sampling method was used to draw representative samples from 15 villages in Western Sudan Region. The structured questionnaire was chosen, as satisfactory method to fulfill the study purposes. Structured questionnaire was prepared and administered to the sampled respondents, by face to face interviews. In addition, interviews were held with local-level government actors and NGOs working in the study areas.
- Collection of secondary data from governmental reports and records, working papers and published and unpublished field surveys. These sources were collected from the ministries, research centers, universities, and NGOs. These secondary data sources are useful for providing background information. These sources also offered some benchmarks for comparison with the researcher acquired data.
- Existing literature on role of SSA women in household food security was reviewed.

The conditions in the study areas are sufficiently representative for the findings of this research to be applicable, with some generalization and conclusion, to rural Sudan (see Endnote 2). The data from completed questionnaire were used for the analysis. Using a widely available and well-tested package program Statistical Package for the Social Sciences (SPSS 11.0® for Windows). Excel statistical program was used for some descriptive explanations.

**The Study Area**

The Western Sudan region collectively constitutes about one–third of the country by area, by cultivable land (about 85 million hectares), and by population (ten million). It has not been possible to cover the whole area of the Region. North Kordofan State is located in central Sudan with Khartoum (the capital of the Sudan) close to its north (see Fig. 1 the map of the study area).

Fig. 1 the study area map




**Socio–economic characteristics of the samples**

The samples interviewed were adult rural male and female farmers who grow seasonal crops for food and cash (see Table 1 the demographic characteristics of the samples). In the study area, besides agricultural activities, people are practicing a wide variety of non–farm activities.

Table 1 The main characteristics of the samples surveyed

| Characteristics | Male | Female |
|---|---|---|
| Samples size (%) | 40% | 60% |
| Family size, mean | 8.5 | 7.9 |
| **Education level (%)** | | |
| Completely illiterate | 16.4% | 27.3% |
| Moderate educated | 64.5% | 62.4% |
| Educated | 19.1% | 10.3% |
| **Marital status (%)** | | |
| Single | 8.2% | 10.9% |
| Married | 90.0% | 69.7% |
| Divorced | 0% | 4.8% |
| Widower | 1.8% | 14.6% |
| **Age Distribution (%)** | | |
| Early Adult (20-30) | 9.2% | 18.2% |
| Middle Age (31-50) | 44.5% | 61.2% |
| Late Adult (51-60) | 34.5% | 17.0% |
| Elderly (>60) | 11.8% | 3.6% |

Ibnouf's calculation based on Western Sudan Household Survey (2003)

Table 1 on the main characteristics of the sample surveyed shows that the majority of the persons interviewed are women (60%), the majority of the interviewed women are moderately educated (62.4%), and the majority of interviewed women are in the middle age (31-50) (61.2%). This finding implies that despite moderate education women are more likely to be more motivated to be more responsible to engage in economic activities related to food security for their families

**Results and Discussion**

The study findings seem consistent with the results in the literature. The study confirmed what other researchers indicated that in the Sudan the dynamics of agricultural expansion may change because of the changing role of agriculture in society due to increased livelihood diversification outside of agriculture (see Elmqvist, and Khatir, 2007, p. 329). The share of agriculture is clearly become insufficient to assure the fundamental household requirements. Rural people have recognized the important of manifold livelihood strategies, as not any of the strategies on their own are capable of sustaining their lives. Livelihood strategies are the product of local knowledge and perceptions operating in reaction to changes in the environment, economy and living conditions. Cultivation of seasonal food and cash crops, livestock rearing, tree growing, collecting of wild food products and income–generating activities are the dominant elements of the livelihood systems for surviving in most rural Sudan.

The nature of farming is changing in many African countries, including the Sudan, because of demographic changes of migration of rural male workers to urban areas. Rural-urban migration of males is on the increase in Sudan as well in most SSA. This phenomenon is unlikely to be controlled given economic and ecological conditions on the Country. Of those surveyed within their household members 35.2% and 52.1% performed permanent and seasonal migration respectively and the majority of them are

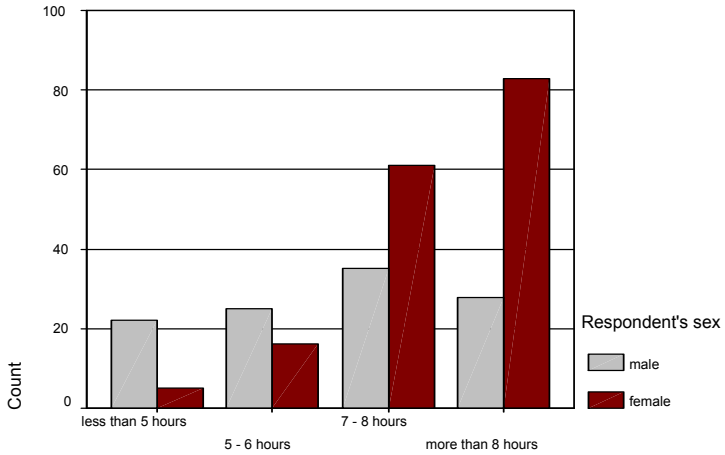
young men. With respect to the seasonal migration, male migrants return to work on farm during the agricultural season. Consequently within the samples surveyed 36.8% of the household were headed by women, either temporarily or permanently. 21.5% households were headed temporarily by women (FHH temporarily) due to the seasonal migration of their male partners for a period of time during a year, while 15.3% of the households are headed permanently by women (FHH permanently) who had no adult male partner (see Endnote 3). This clearly reflects increase of role of women in agricultural activities, as males are transformed into wage migration laborers leaving the fieldwork and family responsibility to women.

**The actual contribution of women to household food security**

This study yielded a number of indicators that women play a crucial role in providing and improving household food security. Women are more likely than men to use available resources and skills to further improve the welfare of their family especially the nutrition and health aspects; this has been highlight by various researchers (Alredaisy, 1993; Jackson, 1996, p. 497; Coonrod, 1998; Smith and Haddad, 1999; Elmasoud, 2001). Despite the additional demands on her time as housewife and mother, woman in rural Sudan have successfully increased the diversification of their livelihood system. They attempt to do that through increasing the capacity of the productive resources family farm, backyard plot (called juburaka in most rural Sudan), and domestic animals, in addition to post–harvest activity (processing and preserving food products), and collecting of forest and wild food.

It confirmed by the study findings (see Fig. 2), women work longer hours than men due to their multiple roles in food production and income activities and house chores, besides their role in collecting of water and firewood and this seems to be significant. Preparing food and baking kisra (see Glossary) and porridge absorb number of hours daily; particularly women usually use firewood and crop residues for cooking. If women's unpaid work was properly valued they would emerge in most societies as the major breadwinners given their greater contribution of working hours than men, the unvalued economic contribution of women is such that any reasonable calculation of their labor would lead to a fundamental change in the context in which today's social, economic and the political policies are framed (Leonard, 2003, p. 84).

Fig. 2 Number of working hours of male and female respondents




Ibnouf's calculation based on Western Sudan Household Survey (2003)

Agricultural production and food consumption patterns have become more diversified over time, in eastern and southern Africa (Byerlee, et al. 2006 p. 278). It indicated by this study and is plentifully obvious from numerous bodies of the study in SSA that women are primarily responsible for food production, food preparation, food storage, and food sale within the family (Hyder, et al. 2005, p. 333). In the study area, domestic animals provide household with the daily high nutrient protein items, such as meat, milk and eggs and thus enable the household to improve its diet nutritional quality. Confirmed by this study and indicated by some studies from most SSA countries the important role of women in animal raising activities and processing of animal products (Nelson-Fyle and Senghor, 1997, p. 31; Sinn, et al. 1999, p. 259).

Fermentation, drying, salting and preserving in sugar are the techniques using for processing and preserving of agricultural and animal food products by women in rural Sudan. These processing techniques help in preventing growth of the micro–organisms that cause foods to decay and foods can be kept at ambient temperatures for long periods and provide nutrients in times of food scarcity. So, locally available raw material is processed into food products at relatively low cost resulting in food with a higher nutritive value compared to the raw material, a better taste and a longer shelf-life (Van de Sande, 1997, p. 309). The processed food items such as, wekah (dried okra), dried meet (merrse), mish (traditional spicy yoghurt) and samin (ghee) (see Glossary), constitute important high nutrient food items and can consume years after they made. Processed and preserved food items contribute to enhancing dietary diversity of household consumption on the sustainable basis. Additionally, some of the processing techniques, such as fermentation of cereals and milk products, found to improve the nutrition quality, functional properties, add flavor and increase the utilization of these food items (see El Tinay, et al. 1985, p. 680; Abdelgadir, et al. 1998; Wambugu, et al. 2003; Belton, and Taylor, 2004). These traditional processed food products (such as wekah, merrse, mish and samin) present an existent possibility for improving food quality and contribute to alleviate malnutrition. In the Sudan, study conducted by El Zubeir, et al. (2005, p. 634) indicated that fermented milk products such as mish and roob are highly nutritious and easily digestible due to the pre-digested nutrients by bacterial starter. Feed efficiency,

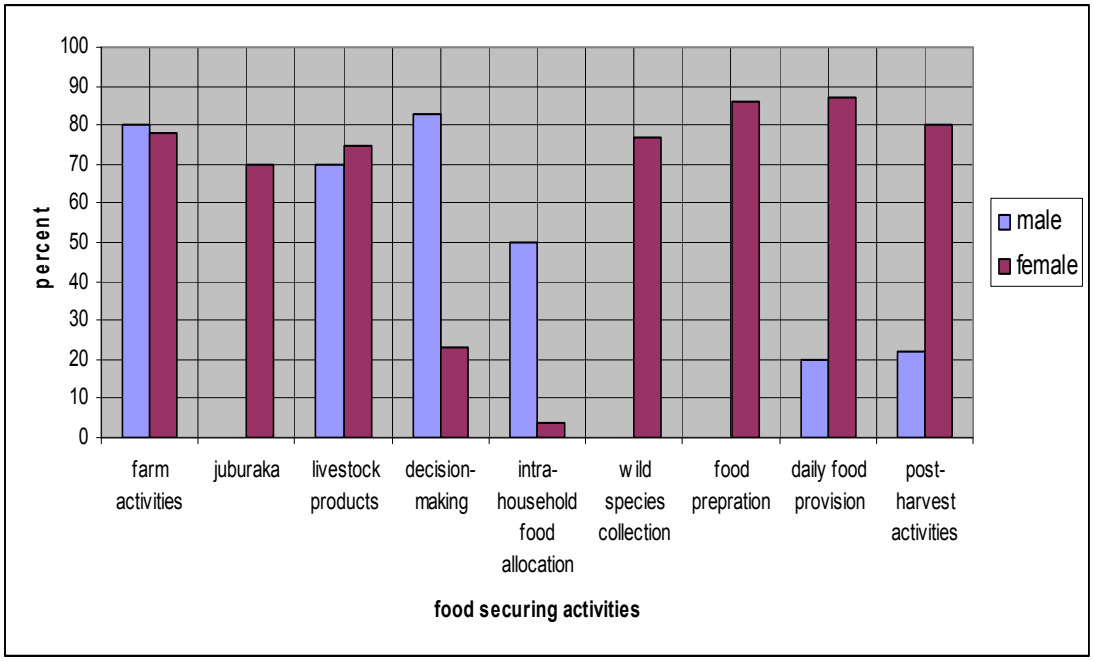
measured as weight gain per unit energy intake, was significantly higher for the home-made yoghurt (roob) diet than for the milk diet (ibid). Therefore post–harvest activities – processing and preserving of food products – greatly increases the value of perishable food stuffs by making them available for longer periods of time (Osunbitan, et al. 2000, p. 557).

Women in rural Sudan are key innovators; they are developing new ways to secure food supplies for their family. Women developed a new food source from watermelon widely grown in most rural areas of Sudan. Women make porridge (bajbaji) from dried watermelon seeds and also use watermelon to serve different nutritional goals such as flesh eaten fresh; watermelon juice mix with honey for the young children; skin dried for animal feed (indicated by this study and confirmed by studies by Ali, 1998 and IFAD, 2001).

The forest tree and wild plant food products contribute to the diversity of household consumption and represent essential substitute foods during food shortage. Collecting of forest trees products including: *Ziziphos spina dris*, *Adansonia digitata*, *Tamarindus indica* and (*Grewia tenax* fruits) and the wild plant food products such as, *(Cassia obtusiflora*) and (*Sonchus spp*.) is exclusively women responsibility with help of their children as indicated by the entire samples surveyed. The nutritionists, interviewed during this study, indicated that there are nutrient–rich wild plant products which are processed and used as foods or as food condiments in Sudan, some of these wild products are not used as foods in their unprocessed state because they contain toxic or anti–nutritional factors. On the basis of the literature review there is increasing evidence to suggest that the traditional rural communities are nutritionally successful, even during periods of drought, affirms the importance of recognizing and utilizing traditional wild food resources (Altieri, et al., 1987 cited in Flyman and Afolayan, 2006, p 493). In addition to their contribution to food diet, the respondents indicated that wild and forest food products represent an income source for women either raw or processed.

In conclusion, the research findings confirmed that women in the study areas, as well in rural Sudan, through diversity of household food provision contribute to controlling the nutritional wellbeing of their family and are more able to improve their household food security. For Mittal (2006, p. 18) a major challenge to household food security comes from the dietary diversification of food basket. Review of developing country studies confirms the positive associations between dietary diversity and nutrient adequacy (diets meet requirements of energy and all essential nutrients) (Ruel, 2002, p. 1). Dietary diversity has proven to be among the most common and valid indicators of nutrient adequacy and/or energy intake (Hoddinott and Yohannes, 2002, p. 36). On the basis of this research finding Fig.1 sums up the role playing by men and women in the study areas in different food securing activities.

Fig. 1 The percentage of respondents involving in food securing activities




Ibnouf's calculation based on Western Sudan Household Survey (2003)

**The contribution of income activities to household food security**

Income activities have a substantial positive effect on the improvement and the sustainability of the household food security. Most African smallholders derive some income from activities outside primary agriculture (non-farm activities), away from their own farms (off-farm activities), or both (Reardon, 1997; Ellis, 1998; Bryceson, 1999; Barrett and Reardon, 2000 and Ellis, 2000 cited in Barrett, et al. 2001a, p. 367*)*. Since income generating from these activities enable household to purchase high nutrient non-staple food and to afford food during food shortage. The crucial role of the remittance from income generating activities to sustainable of household food security indicated by this research finding and supported by other researchers (Ali, 1997; Alderson 2001; Gordon and Craig, 2001, p. 8). Study by Ninno, et al. (2007, p. 20) linked food security at the household level to access to food, which is closely linked to household incomes. Hassan and Babu (1991, p. 452) in their study of farming community in the Sudan found that better access to productive assets, increased non-farm and on-farm employment opportunities were reduced the poverty and improve the household wellbeing.

Income earning from income generating activities contribute to sustaining household food supplies and improve its wellbeing. The study findings indicated that there is a significant difference ($p>0.5$) between men and women's expenditure patterns (money allocating for food and non–food items). Compared to men, women earn lower incomes, but tend to allocate more of their earnings to buy food items for their household, while men often spend part of their budget on other purposes (see Table 2). These findings, supported by many other studies such as studies by Quisumbing, et al. 1995; Bradshaw, 2004; Rao, 2006 that men and women tend to spend their income differently, women use almost all of their income to satisfy the food needs of the household, while men is often used cash income for other purposes. Men usually hold back income for

themselves and that, on average; they allocate only between 50% and 70% of their total income to the household (Bradshaw, 2004, p. 14). Women's involvement in income-generating activities has greater significance than simply increasing their own or household income, Islam (1997) states it improves household welfare, child nutrition and education (cited in Gordon and Craig, 2001, p. 23). Jackson (1996, p. 497) pointed out that despite the diversity and complexity of the work on incomes within households, there is evidence that women spend much of their money on children and household needs than men.

Table 2 The male and female Respondents' expenditure pattern

| Respondents' expenditure pattern | | | Respondent's sex | | Total |
|---|---|---|---|---|---|
| | | | male | female | |
| | food items | Count | 78 | 145 | 223 |
| | | Expected Count | 89 | 134 | 223 |
| | other non-food items | Count | 32 | 20 | 52 |
| | | Expected Count | 21 | 31 | 52 |
| Total | | Count | 110 | 165 | 275 |
| | | Expected Count | 110 | 165 | 275 |

**Chi-Square Tests**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 12.395[b] | 1 | .000 |
| Continuity Correction[a] | 11.313 | 1 | .001 |
| N of Valid Cases | 275 | | |

a. Computed only for a 2x2 table

b. 0 cells (.0%) have expected count less than 5. The minimum expected count is 20.80.

Ibnouf's calculation based on Western Sudan Household Survey (2003)

**Intra–household variables and household food security**

Intra–household variables such as household decision–making and intra–household food distribution affect household food supply and provision, and in turn household food security. From economic perspective the findings of this study indicate that women are more likely to be more rationale compared to men in terms of decision making for allocation of relatively scarce resources (income and food) to maximize the utility or satisfaction of their household families. This study finding seems consistent

with the results in the literature in regarding to household decision-making process (see for example Dasgupta, 2001; Kalabamu, 2006; Levin, et. al, 1999).

In respect to intra–household food distribution, the cultural factors often organize food allocation. The different patterns of intra-household food distribution in different parts of the Sudan may be attributed to cultural beliefs and ethnicity of the population. Traditionally in the study area and in most rural Sudan as well, men eat first and get the best and then women. As Table 4 shows that the samples surveyed revealed that male members of household eat first and get best part of food items, then children and last women get the rest.

Table 3 Intra-household food allocation of the samples surveyed

| | Intra-household food allocation | | | |
|---|---|---|---|---|
| | feed first | | get the best part of foods | |
| Who among household members | male | female | male | female |
| myself | 41.8% | 0% | 80% | 0% |
| husband | 0% | 26.7% | 0% | 50.9% |
| adult male members | 10.0% | 18.8% | 10.0% | 21.2% |
| elderly people | 4.5% | 4.8% | 0% | 0% |
| young children | 37.3% | 29.1% | 0% | 0% |
| all household members together | 6.4% | 20.6% | 10.0% | 27.9% |
| Total | 100.0% | 100.0% | 100.0% | 100.0% |

Ibnouf's calculation based on Western Sudan Household Survey (2003)

Many studies confirmed the fact of inequality of intra-household food distribution between genders. Hyder, et al. (2005, p. 330) in their studies of Tanzanian and Kenyan women found unequal pattern of food distribution between genders (differential amounts or quality of food served to men) within the household from the childhood through the adulthood. Nevertheless, indicated by these study findings and confirmed by other studies that gender bias in access to food appears to be a problem of quality much more often than one of quantity (see DeRose, et al. 2000, p. 518). The new trend of eating from the common dish and sharing the available foods together is generally on increase in rural Sudan. The Sudanese people are incredibly hospitable, and will willingly share what little food they have with relatives and neighbors. Normally women performed inter-households food distribution with their neighbors in the local community and this is not limited to the time of food shortage. The production relation in traditional societies was based on ties of kinship and affinity. During intensive food crisis branches families join their main families in order to share with them the available foods. Eltigani (1995) noted that the traditional societies in Sudan developed a system of redistributions and generalized reciprocity to deal with food crisis and to support group self-sufficiency and welfare. Effective solidarity mechanisms especially between Sudanese abroad and their

kinfolk at home seem to have managed to disguise the 1993 food crisis to a considerable extent.

In conclusion, this study argues that women in rural Sudan are tend to use available locally resources effectively in their diversification strategies more likely than men, many of whom migrate seasonally and even permanently, and since women are responsible for food preparation, processing and food distribution, they contribute more to household food security, than men. Fig. 3, Appendix 1, summarizes this study finding.

**Implications for Reducing Hunger and Malnutrition**:

There would appear to be some important implications for reducing hunger and malnutrition arising from this study:

- Women in most developing countries tend to be responsible for producing, processing and preparing food for their household. Coonrod, (1998) pointed out that much of the essential work for ending hunger, particularly in developing countries, rests in women's hands. Research in most SSA indicated that the women's activities in support of their families determine how much food available for family consumption and hence the nutritional status of their household members (Odii, 1996). The existing literature reveals that increase of male out–migration in most African countries increase a role of women in farming production and in the household (see Aredo 1998; Guvele, et al. 2003). The contribution of women to agricultural production in rural Sudan is considerable due to male out–migration to urban areas and abroad, and because of droughts and desertification problems, war and tribal conflict (A/Karim, 1996). The demographic changes of SSA rural areas, as in rural areas of the Sudan, due to out–migration of males, imply the need to give more attention to women farmers who substitute males in agricultural work. Recognition of the crucial role of women in food production and non-farm activities is the first step toward the integration of women in food security and reducing hunger programs.
- It confirmed by this study, women with adequate access to food production sources, with different sources of incomes, and with controlling the nutritional wellbeing of their household (type of food consumption and food preparation) are more able to improve their household food security. The home-garden or backyard plot juburaka's products, which are completely managed by women, provide family with various nutrient food products. This is because more diversified food products, such as beans, okra, and green vegetables are cultivated in juburaka than in farm (usually produce grains, millet and sorghum). Chambers and Momsen, (2007, p. 48) found that the home-gardens are frequently a source of great diversity of foods. Some researchers indicated that very small mixed vegetable home-gardens could provide a significant percentage of the recommended dietary allowance for protein, vitamins, and minerals (Marsh and Talukder, 1994 cited in

Marsh, 1998). Howard (2003c, p. 4) succinctly describes the home-gardens as an 'indigenous experiment station or gene bank' (cited in Chambers and Momsen, 2007, p. 48). The home-garden or backyard plot (juburaka) is completely managed by women in the Sudan, as well in most SSA, and they always take decisions about what to produce on it – it is "a keystone" in family food security. These small backyard plots (juburaka) contribute to promote food security at household level, to diversity food consumption and to enhance nutritional wellbeing for household members (see Yiridoe and Anchirinah, 2005, p. 168).

- Women in the study areas, as well in most SSA, responsible for collecting of forest trees and wild food products and they are free to market and determine the prices. These forestry and wild food products appear to contribute to the household in various ways: represent a supplemental food items on the daily consumption (either as ingredient or spice) and contribute to the household budget as a source of income. In addition, in the Sudan processed and preserved forest foods products help in some cases to insure a year round food supply (Hamid, 2006, p. 2). There is increasing consensus that wild foods could significantly contribute to alleviating food insecurity and the malnutrition (Burlingame, 2000 cited in Flyman, and Afolayan, 2006, p. 493).
- Post–harvest activities have a substantial positive effect on sustainability and improving of household food security and hence contributing to reduce hunger. Post–harvest activities refer to the processing and preservation of agricultural, animal, and forest and wild food products. Processing of raw products leads to a general improvement in the shelf life, texture, taste, aroma, as well as nutritional value. According to the samples surveyed of this and some researchers the processing and preservation of food is exclusively women responsibility (see for example Duggan, 1998, p. 103). Furthermore, crop processing may enable households to obtain higher returns from agriculture, and in this sense they may have a positive impact on reduction of malnutrition and poverty (Davis, 2003 p. 26). As is confirmed by this study and suggested by recent existing literature that food security cannot be assured only by raising crop and livestock production, but the integration of food production with food preservation and processing and distribution can contributing significantly to assured food security (see Hulse, 2004, p. CRH130). Moreover, indicated by the samples surveyed women tend frequently to increase the storage capability, and developed new food source to diversely food provision for their household members.
- On the basis of this study finding and supported by other studies (see Maxwell, 1999; Hyder, et al. 2005) women have found to control their family nutrition status through food preparation, processing of food products, and through daily determining of quantity and quality of

food provision. Hence, women contribute to enhancing their household nutrition status and in turn contribute to reducing hunger and malnutrition.

- Throughout SSA countries, women contribute substantially to the family budget through income generating activities. Even when a woman is not completely alone, her contribution to the budget is of utmost importance to the family, the more so because women spend much of their income on family welfare. Koopman (1998, p. 137) argues that women's incomes are more explicitly oriented toward the maintenance of household food security than men's. Women's involvement in income-earning opportunities has greater significance than simply increasing their own or household income; it improves child nutrition (Gordon, and Craig, 2001, p.23). Studies by Lloyd and Gage-Brandon, 1993 (cited in Levin, et. al, 1999, p. 1978) and Levin, et. al, (1999, p. 1989) found that women's access to the cash economy contributed to an improved economic standing of households in which children are being raised and food consumption, measured by adjusted consumption expenditures, were highest in those households where women are the primary head of their own household.

**Recommendation and the Way Forward:**

This study argues that there is a need to reformulate food security policies in a way that realize and enhance the crucially important role played by women in household food security in the Sudan, as well in most SSA. This should be one of the essential steps, among others, to improve of household food security.

- Emphasis on improving womens' role and enhancing their power without appropriate understanding of activities performed by women, in agriculture or informal sector and social constraints due to cultural practices in different parts of the SSA will result in inappropriate policy. Meaningful development strategies demand an appropriate planning approach, which should be gender-aware and should include consideration of community and household habits. The customs, tradition and social constraints often prevent women to gain benefits from the development efforts. This emphasizes the importance of analyzing each social system in terms of the decision-making process, division of labor and gender relations and not relying on generalizations in the literature when planning for food security strategies and plans (Muneer and Mohamed, 2003, p. 256).
- The role of home-gardens or backyard plot (called juburaka in most rural Sudan) in household food security has not given sufficient attentions in rural development policies, and not including in NGOs programs. Howard (2001, p. 5 cited in Chambers and Momsen, 2007, p. 48) states that 'like much of women's work, home gardening is relatively "invisible", undercounted and often disparaged as "minor" or "supplemental" to agricultural production'. Chambers and Momsen

(2007, p. 48) states that we found that home-gardens (small plots near the home) were often overlooked also because the size of the plots was perceived as too small to be of significance. Well-developed of home-garden (juburaka) can play a crucial role in providing household of high-nutrient food items, in low input costs, through producing diversity of food items that consume on a daily basis. Promoting home-gardens can contribute to increasing dietary diversity, while improving food supplies and incomes at the same time (FAO, 2002).

- The study findings as well as many studies from different parts of SSA found that women improve their household food security through expanding their income-generating activities, and enhancing food availability (farm, livestock, home-garden, processing and preservation and wild foods) are strictly limited by lack of the credit services, lack of time, lack of skills, education, and marketing problems. In addition the rural society in most SSA dictates a heavy domestic role for women not only childbearing, child-care, and household duties, but also water and fuel wood fetching, which are physically demanding and time consuming. Great efforts should be made to assist women to relieve their time constraints. This potentially contributes to increase their role in improving the food security at the household level. Technologies could be designed specifically to address women's needs, give them more time to increase their productivity and reduce their workloads. Improving their access to simple appropriate technology like alternative sources of the cooking fuel shortens the process of food preparation, reduces the need for daily firewood collection, and provides additional time. Therefore, technology designed specifically to address specific womens' needs will certainly assist them in reducing their workloads, save their time, improve the quality of life of the women themselves and in turn, increase their contribution.
- Women determine the nutritional status of their household members through determining of quantity and quality of food provision on the daily basis, food preparation and processing of agricultural and animal products. Traditionally in many parts of SSA, including the study area; women take their meals after men throughout their lives, even when pregnant or lactating. There is a need for appropriate culture-based gender awareness for both males and females, in order to change the eating habits. Food allocation must take into account physical workload and the specific nutritional needs of each family member. Meeting the nutritional requirements of individuals requires appropriate dietary practices, which are strongly influenced by nutritional knowledge and cultural biases, as well as by the competing demands for the time of the household's main caretaker (women) in the preparation of quality meals (Riely, et., al., 1999, p. 16). Although there is an improvement in the indicator of the literacy rate among the rural population in the Sudan, however, the parents' disinclination to

educate daughters due to social norms, that education of girls brings no returns. Furthermore, the introducing of school fess under the national economic reform policies is standing in the way of the educating girls. Various studies across diverse developing countries found the strong positive correlation between literacy and various education levels of mothers with children's nutrition levels (Ramachandran, 2006, p. 16). Pena (et. al. 2000) found evidence that even a slight increase in women's education does have a meaningful impact on the health of children (cited in Hyder, et al. 2005, p. 334). Providing girls with equal access to education and training is another long-term strategy that will be important to sustain changes in the status of women (Hyder, et al. 2005, p. 334).

- As the consequence of implication of liberalization policies, the Sudan has faced serious economic difficulties which culminated in economic decline and mounting food–insecure–people (Mahran, 2005, p. 5). Implementation of such policies led to increase in the number of poor households, a widening gap between income and the cost of basic needs, and a growing inability to access services like health and education due to cut–backs in government subsidies for these basic services. Thus, the Governmental strategies and policies for protecting peoples' access to food and enhance their entitlement to purchase food are effective instruments to achieve food security in Sudan. The hunger reduction in Sudan is simply to ensure that people without purchasing power are able to weather episodes of high prices or market disruptions without continuing chronic hunger or asset shedding that would erode their future productivity. Strengthen of the women status should be the main concern, so they will be in a better position to contribute to the hunger reduction and also to the national development process. As confirmed by this study and many other studies from different parts of SSA that essential work for reducing hunger rests in women's hands.
- Elimination of all forms of discrimination in the national policies against women is essentially required. Most of the rural women's food work of feeding recognize in the national policies in the context of 'the domestic work'. Respecting rural women's equal rights to ownership and control of resources is undoubtedly increasing their capacity to produce food. Estimation of rural women's contribution to food supply and valuing of their potential part in reducing hunger and malnutrition will lead to positive effects of policies on women's rights to provision adequate quality food to their family.
- Adopting grassroots organization elsewhere has been found to be a main factor behind improvements in access to resources and services (and can encourage women to come forward and claim their rights to these resources). Strengthening womens' status through developing local grassroots organizations should provide them with more links to the formal government institutions and hence better access to

resources and services. Therefore, forming and developing women grassroots organizations could be a key to improving household food security and women status.

## Glossary

Juburaka is a plot within a fenced household area or a site within walking distance from the home, rarely exceeding 1 acre and is completely working by women.

Kisra, is the staple food of people in the whole Sudan. It is a thin pancake like leavened bread made from fermented sorghum flour usually served with stews or sauce.

Mish The starting material for making mish is roob and fresh milk is added to it each morning for days and the whole black cumin seeds and garlic are adding to the fermenting milk. Fermentation and aging are allow to proceed for 1 month and the product is consumed as it comes.

Roob is natural yoghurt made at home and/or it is the by-product of samin production is consume as it is or it cooks into sauce for porridge.

Samin is a traditional butter. Women usually put souring milk into a leather bag and roll it manually until butter extraction (samin) and the remaining sour milk is the traditional yoghurt (roob).

Weka is fresh green okra dried under the sun and then ground to powder and can be preserved for years.

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## Endnotes

[1] The Rome (1996) Declaration on World Food Security and Action defined food security as: "…food security, at the individual, the household, the national, the regional and the global levels exists when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary level needs and food preferences for an active and healthy life" (The Rome Declaration on World Food Security, 1996, p. 807-809).

[2] Rural Sudan areas are dominated by open countryside, low population densities, small villages, the primary activities in rural areas are based on natural resources and closely related activities.

[3] Three different household types are distinguished in this study: male-headed household (MHH), female headed household temporarily (FHH temporarily), and female headed households permanently (FHH permanently). MHH are those units of which the male head of the household and present at the homestead the whole year. In contrast, FHH temporarily, male head is absent from the home for a period of time during a year. In this case the woman acts women temporarily act as a head of the household during the absence of their male partners. Households with a woman as FHH permanently are the female-headed units. In these cases, women may have lost their husbands, are divorced, unmarried, or have remained single due to permanent migration of their male partner(s).

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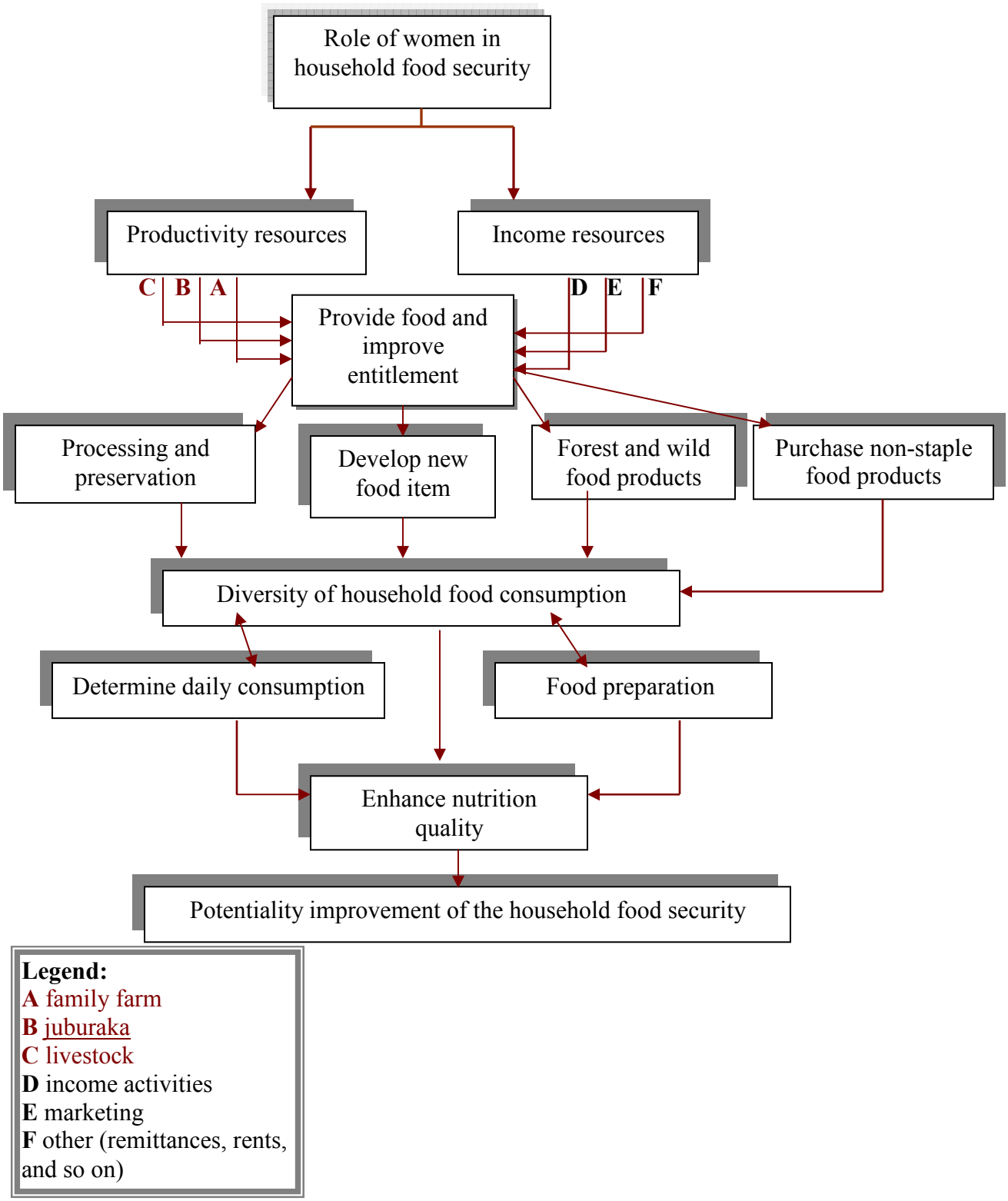
**Appendix 1**

Fig. 2 Role of women in providing and improving household food security in Sudan




Drawing by Ibnouf, based on Western Sudan Household Survey (2003)