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RESEARCH ARTICLE

Role of Rural Women in Sustaining Household Food Supplies in Western Sudan.

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Abstract

In the context of rural Western Sudan, where recurrent droughts, socio-economic problems, conflicts, and males' outmigration, recognition of role women in household food security is a particularly important. The study aimed to assess rural women's contribution to sustain household food supplies, and thus valuing the potential role of women in achieving household food security. Employing primary and secondary data, the study argues that rural women play a crucial role in sustaining foods for smoothing their household consumption, thus, they contribute more to achieve household food security, more likely than men do. This study indicates that food preparation, processing and preservation, and the daily food consumption quantity and quality are exclusively women responsibilities. The work of rural women as food producer and provider is lack recognition and assessment and thus support and assistance. Understanding the actual contribution of rural men and women in household food security will help designing policies and programs to address the challenges of food security in Western Sudan. The status of rural women as food provider can be enhanced and empowered through adoption of supportive national food policy.

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Introduction:-

Data on women's contributions to agricultural production is increasing; however, there is still a lack of sex-disaggregated data on women's contribution to household food security in Sudan. One reason for underreported women contribution to food security could be that the data do not account for many of women's productive activities. Unaccounted women contribution to food security include activities such as home gardening (known locally *juburaka*), animals rearing, and post-harvest activities of agriculture and animal products (processing and preservation). Additionally, while women usually perform field cultural activities, these roles may be counted under 'helpers', unpaid family laborers, rather than as actual contributors to household's economy. Women's productive work in the Sudan, such as agricultural labour, tends to be perceived as an extension to their household duties (Osman, 2002, p. 24). Development policies affect women and men differently, and influences gender relationships, regarding women as beneficiaries and as such, they do not enjoy an equal position with their male counterparts.

Rural areas in Western Sudan were affected by the natural hazards, socio-economic problems and civil conflicts. Consequence of these risks has a considerable gendered impacts and differentiable gender workloads and roles. Not many attempts have been made in food security literature to link these risks and circumstances in a systematic way to gendered consequences. Among gender impacts of these crises are their impacts on responsibility to achieve household food security as men and women respond differently to these risks. Examples of these: (1) while rural men have more possibilities to migrate outside the risk areas, rural women are usually less mobile, and as consequence, women's role may become more important as producers of subsistence for families. (2) Shifts in the labor market, where men are taking earnings that are more rewarding than those activities taken by women who are

being pushed into non-monetized subsistence activities. (3) Men are more dominant in the cash crops activities and wage employment whereas women work in food production, where they get lower or no financial returns for their activities. (4) The escalating cost of living in the country during the last three decades has led to increase the role of women in the rural economy. (5) In war-affected areas, conflicts break down economic and social structures, which often results in an increased burden on women, both during and after conflicts to provide food for their families. Since work of rural women remains mainly within the subsistence and informal economy, they continue to lack recognition and assistance. Rural women tend to be bypassed by resilience-building initiatives – including inputs, credit, extension, education, and training services. Within the agriculture sector, compared to men, rural women generally held less power with regard to resource ownership and management. Lack of gender assessment in development policies meant their impacts on women are particularly weak.

This study endeavors to increase the understanding of the role of rural women in Western Sudan to household food security in attempt to assist in developing gender sensitive interventions and policies. Enhancing women food production and provision capacity has unquestionable direct impact on household food security and nutrition. The research also aims to contribute to the burgeoning literature on role of rural women in household food security in the most adversely affected region in the country. It focuses on issues that influence interventions that can serve the prospects for increased equity and living standards for women as food producers and providers. The identified issues will help to come up with recommendations for how rural women can best be supported and empowered.

Rural Sudan context:-

Sudan is located in northeastern Africa (Fig. 1 Sudan map). The climate of Sudan is as diverse as its vegetation and geography. Sudan's territory is diverse environment ranging from arid desert in the north to rich savanna in the south. Sudan is rich in terms of its natural resources (Ayoub, 1999). Agriculture remains an important sector of economy contributing around one third of gross domestic product (GDP) and providing livelihood to about 70 percent of the population. The sector accounts for a large share of export revenue, supplies raw materials for food processing industries, and plays a vital role in the national food security (Mahran, 2005, p. 3). Agriculture play multiple roles as a source of employment, livelihood besides acting as the main engine of economic activities (Maxwell, 2001, p. 32). Formulation and implementation of rural development projects ignore and undervalue women. For instance, modern agricultural technologies usually assigned to men. Due to lack of gender classification in different agricultural and household activities, work done by men is only recognised. Rural women farm and nonfarm income generating activities are generally ignored in the national statistics. However, women play essential economic roles that enhance livelihood opportunities and sustain food supplies for their household's members.

Fig. 1 Sudan map



The contribution of women to agricultural production in rural Sudan:-

Historically, according to the Sudan labor force census for adults in 1955–1956, the percentage of rural women who practice agricultural work was 12.8 percent, while men accounts for 87.2 percent (Baderi, 2002, p. 74). However, since then, the contribution of rural women in the agricultural sector in Sudan in general is far greater. This is consistent with a relatively large body of literature, which suggests that from the early 1980s rural women's role in agricultural sector has increased significantly (Eltigani, 1995; A/Karim, 1996; Ali, 1997; Baderi, 2002). This has been the consequence of a number of phenomena. First the drought that has struck Eastern and Western Sudan in the 1980s and 1990s. The second phenomenon is the civil war and tribal conflicts. Beside, implementation of structural adjustment and market liberalization policies since the eighties of last century led to escalating cost of living due to eliminating government subsidies and prices control. Along with these changes, women's roles are changing in the food production sector and household food security.

Nature and extent of women's involvement in agricultural sector varies widely across different ecological zones and farming systems and from region to region in the country. Women's contribution involve all farm production activities, but much higher in traditional farming areas. Participation of females in the traditional rain-fed agricultural areas reaches 78 percent in North and South Kordofan (Ibnouf, 2011, Alkareb, 2003). In addition women play a major role in backyard plots, a finding that is consistent with what is reported in the literature across developing countries (Mukadasi and Nabalegwa, 2007; Scanlan, 2004). Rural women share similar problems with men in many respects, although women identified constraints and opportunities that differ from men and attributed to gender within their culture. Rural women work in the food production sector continues to be under rated and unrevealed in national food security policies.

Census data does not reflect rural women actual work in agriculture since it does not account for female unpaid family work in farm activities. Problems of conceptualization, definitions of terms, and procedures plague national censuses and statistics of labor force for both males and females. The 1993 Sudan Population Census estimated that only 24.7% of the female population was economically active compared to 71.3% economically active male population. The Census of 2008 shows that the majority of Sudanese men labor force (48.13%) work in the agricultural sector followed by the service sector (35.9%). While women labor force in the agricultural account for 49.48% followed by the service sector 22.45%. A study by the Arab Labor Organization (2007) concludes that women's work in agriculture is higher than men's work. According to the study, men constitute the majority of total employment in all sectors (76%), whereas women constitute the minority of total employment in all sectors (24%). However, women constitute the 66% of the agricultural sector labor force compared to males, which constitute 37%. In the service, sector males constitute 40% of the labor force, while women account for 27% of the services sector employee (ibid). Women are concentrated in the low-paid informal sector.

There is gender division of labor traditionally in the rural areas. Women responsibility in farm work is on the increase; beside they hold the biggest part of the household work. Activities in the household involve food processing, preservation and preparation, fuel and water collection, and caring for the children and the elderly. National statistics accounts ignore women's unpaid activities as they are classified as unproductive work. Tasks carried by women at home, are not regarded as being "real" work since the house is not considered, as a workplace (Kynaston, 1996, p. 224). Consequently, there is an underestimation of women's contribution to the household food security and nutrition.

Research Methods:-

The study draws on findings from field surveys from previous published and unpublished studies undertaken by author (Ibnouf, 2008, 2009, 2011) in rural areas of Western Sudan. Moreover, key informant interviews were used to gather in-depth information on a particular issue of regular and irregular foods diets in rural Sudan (conducted in 2013). Key informant is adopted in this study as a great way to compliment quantitative data by providing greater context to the study. Available statistical data from 5th Sudan's Population Census 2008 were used to support the analytical data of this paper and to provide information on the profile of women's status in Sudan. The Census includes socio-economic information, among others. This study also uses reviews of literature to provide an overview of role of rural women in household food security. These sources offered benchmarks for comparison with the study findings. Data was analyzed using the Statistical Package for Social Sciences (SPSS 11.0[®] for Windows). Qualitative information generated during the key informant interviews was summarized and the results were presented in the study.

Research Discussions and Findings:-

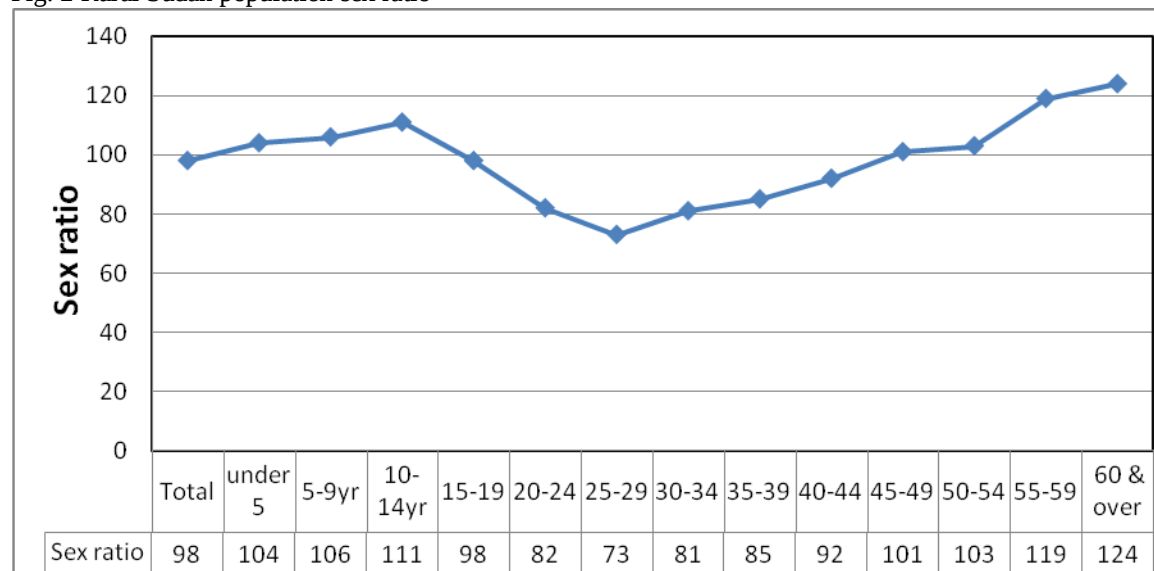
Who are the principle producers of food in subsistence agriculture and providers of day-to-day family subsistence? To what extent rural men and women smooth food consumption over seasons (normal and lean seasons). Which means are most effective and efficient to sustain food supplies, and to cope with rising complexity and climate-induced crises and stresses? What is the impact of male out-migration on women role in household food security? Answering these questions not only sheds light on the role that man and woman plays in providing sufficient, safe and nutritious food supplies to their household. Men and women use a variety of coping strategies to deal with and manage the crises associated with food insecurity.

The changing structure of rural communities in Sudan:-

Based on Sudan's Population Census of 2008, rural people constitute 61.48% of the total population. Sex ratio in rural areas is highly feminine compared to urban and nomadic populations. According to the census data, the sex ratio is 102 for the total population and 105 for the urban population, whereas the rural population has a lower sex ratio of 98. This higher femininity ratio is primarily due to the outmigration of males from rural areas. Research in Sudan showed that primarily males who emigrate from rural to urban areas (see Aldeshoni, 2005; Karrar et al. 2006). This was also the case in most developing countries (Agesa, 2004; Barrios, et al. 2006; De Brauw and Rozelle, 2008). Cultural factors may play a role in males and females migration from rural areas. Depending on the nature of the job, men may be preferred to women as an example the case of mechanized agricultural schemes, which favor male workers to female. Agesa and Agesa, (1999, p. 52) point-out the incidence of rural to urban migration is higher for males because their gains out of migration are greater than females (see Fig. 2).

Elsewhere in developing countries, the mobility of young males in search of opportunities in urban areas remains a constant feature of migration (Adepoju, 1995; Anríquez and Stloukal, 2008; de Jong, 2000; De Haan, 2002). Anríquez and Stloukal, (2008) states migration usually is age-selective and comprises mostly young adults who migrate to cities to seek urban employment. A high sex ratio of the age groups 60 and over in rural areas may indicate returning of migrant men to their home villages after working for a period or after retirement. Rural outmigration of males occurs results in feminization of rural Sudan. Consequently, women are currently a growing presence in all-economic activities of the rural areas.

Fig. 2 Rural Sudan population sex ratio



Sources: Data for this graph are derived from 5th Sudan's Population Census 2008 Table 11.5 (Central Bureau of Statistics, 2010)

All households have member(s) who are migrant workers. Out-migration in search of better opportunities has long been one of the regular strategies for the livelihood systems of males in rural Sudan (see Eltigani, 1995). There are many types of migration including return, repeat, circular, permanent, and temporary migration (De Sherbinin et al. 2008, p. 45). The respondents reported that they have at least one migrant male member (either permanent migrants

35.2% or seasonal migrants 52.1%) living and working elsewhere (in urban areas, big mechanized schemes or employed abroad). Seasonal migrants usually return to the area during the cropping season. These findings are consistent with a case study conducted by Tacoli (2002) which showed that between 50-60% of households in rural Tanzanian households have at least one member away, while the figure for rural Mali was 80%. Among the surveyed sample, 41.8% of males are returnee migrants (over 50 years old). Larger proportions of males' resident at home of the sample surveyed were in the age group of over 50. While 79.4% of the females were in the age groups under 50 years of age. This shows that male's migration is a key factor in the gender imbalance within rural population. These led women to manage household resources in absence of men as household heads. Between households surveyed 7.6% reported that they have female members who migrate to urban areas. In their study of South Africa, (Posel, et al. 2006, p. 847) found that women are significantly less likely than men to migrate.

Gender division of labor in rural Sudan:-

Gender roles are played by men and women are not determined by biological factors but by their socioeconomic and/or cultural environment (Mollel and Mtenga, 2000). Social structures assign power to women and men through their access and control of live-based productive resources. The ability of women and men to produce, provide, distribute, control, and consume food can be understood as an indicator of their power within family and the society. In Sudan, subsistence activities on which the lives of rural people depend are oriented around farming activities. Men dominate cash crop production, while women are responsible for crops intended for household consumption. In rural areas of Sudan, men traditionally perceived as the primary food providers and women as dependents. In Western Sudan, women play major roles in their households' food security from production to consumption (Ejembi, et al., 2006, p. 63). In Sudanese culture some food-related activities are gender specific. In spite of their increasing role in agricultural production, women in rural Western Sudan, still perform gendered domestic activities such as raising smaller livestock, collecting wild food, gardening backyard plot, processing and preserving of food products, and supplying water and firewood.

Time spent in work activities: longer working days for women:-

The results of a survey in rural Western Sudan shows that women work more hours than men due to their multiple roles in family farm, home gardening, food preparation, post-harvest activities and income activities (see Table 1). This is consistent with the findings of Alkareb (2003) in the traditional rain-fed farming of Nuba Mountains of South Kordofan State. He estimated that the workday of woman in farming during the agricultural season is 8 to 10 hours, while males' works for seven to eight hours. These differences suggest an important difference for how work is spread by gender in the rural area context. Case studies from developing countries indicate that women spend more time in domestic production activities than men do (Engle, et al. 1999, p. 1318). Results of this study indicate that cooking is regard as 'female duty' in rural surveyed areas; none of the men of surveyed were involved in food cooking. Cooking is one of the main daily activities, which consume considerable amount of times. In rural Western Sudan, women use firewood and crop residues for cooking. Women face double workload due to challenges that come with climate change causing them take longer time to access basic facilities they require for their daily needs, i.e. water and firewood. Water collection is time-consuming tasks and absorbs a considerable amount of women time daily. Water shortage problems in rural Western Sudan are common, especially in area that depends on surface sources. Women walk long distances and spend hours searching for water sources in years of low rainfall. Study by Alston (2007) reached similar results and shows the impacts of reduced availability of irrigation water, cooking and drinking water are on rural women.

Table 1: ANOVA on the number of working hours of male and female respondents

ANOVA					
Variable Sex	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	8.993	3	2.998	14.251	.000
Within Groups	57.007	271	.210		
Total	66.000	274			

Data for this table is derived from the researcher field Survey in Western Sudan

The long dry season in Western Sudan causes, a real pressure on rural women (and their female children) charged with fetching water for both human and animal consumption because this task is burdensome. Women interviewed

indicate that they make at least two trips daily to wells or *hafiers* (see Fig. 4). Hafier are large earth embankments indigenous technique of water harvesting in Western Sudan.

Fig. 3 Women carrying water on their head



Fig. 4 Women carrying firewood



Interviewed women indicated that introduction of simple, low cost, and energy-efficient cooking stoves help in shortening the process of food cooking and reducing the need for daily firewood collection. Also, introduction of water pump-wells in some villages assists in shortening the water collection time. A majority of women interviewed in such rural areas indicate that they are usually using their time saved, drudgery reduced from fetching water and collecting firewood for cultivating vegetables in backyard plot for sale and/or for involvement in income activities.

Sustaining household food supplies:-

The result the study indicated that rural women more than men are responsible for the activities that sustain food supply in the long term. Rural women use various means to preserve foods and effectively smooth household consumption over time in rural Sudan. Food-grains such as sorghum, pearl millet, beans and groundnuts are dried under the sun to increase their shelf life before storage in underground pits or traditional grains stores 'soyba' (see Fig. 5) to reduce pest damage. The processed and preserved food items are essential ingredients in the daily diets and during food shortage times as confirmed by the surveyed sample in rural Western Sudan. As is shown by an example of Darfur Region during the region famine of 1985, it is well recognized that women more than men engaged in activities to reduce the risk of famine for their households (Elbasher, 1994). Rural women play a crucial role in sustaining household food supplies more than men do.

Fig. 5 The traditional grains store 'soyba'



Researcher, field surveys in Western Sudan

Women role in post-harvesting activities:-

Post-harvest activities, which refer to preserving and processing food products, are essential for household food sources. Processed and preserved food products assist to ensure a year round food supply and hence contribute to smooth household food consumption. Post-harvest activities are women's responsibility and all surveyed sample and women in different parts of Sudan confirmed this fact. These findings are consistent with a large body of literature in Sudan and developing countries (Dirar, 1993; DeRose, et al., 2000; Hulse, 2004; Hyder, et al., 2005; Ibnouf, 2012; Sikod, 2007). Only 3% of men within the surveyed sample indicate that they are engaged in sesame and groundnuts oil processing for the household consumption and sale using local squeezers driven by camels. Rural women use a diversity of traditional food processing techniques to increase shelf life of agricultural and animal products. These non-farm activities enable households to obtain higher returns from agriculture that have a positive impact on food security (Davis, 2003 p. 26).

Women's indigenous practices in food processing and preservation of food products are bridged food shortage resulting from unfavourable climate conditions or armed conflicts. Traditional approaches of processing and preserving of crops, animal products, and wild foods are based on indigenous knowledge. Dehydration, fermentation, smoking, sugar preserving, and salting are indigenous techniques employed by women at time of abundance for times of scarcity. Thus, these food processing techniques and skills add to the shelf life of seasonal product and contribute to sustainable food supplies.

Fermentation is one of important traditional techniques used by women for processing agricultural and animal products to preserve these products for years. The importance of traditional fermented foods was documented by domestic and African studies (Dirar, 1993; Ibnouf, 2012; Yagoub, et al. 2009, Blandino, et al. 2003; Gadaga, et al. 1999). Fermented food in Sudan include a wide range of edible or barely edible materials, such as cereals, milk, fish, meat, fruit and honey, and unorthodox materials such as bones, hides, hooves, caterpillars, locusts, and cow urine are also fermented as delicacies and/or pounded powders to use as condiments for sauces (Dirar, 1993). Rural people eat foods based on fermented cereals such as sorghum and millet, fermented dairy products, fermented fish products and fresh and/or dried vegetables and wild green leafy vegetables such as (*Sonchus* spp.) and fruits, depending on their availability.

The survey revealed that food shortage tends to occur annually in 39% of the cases, and on seasonal basis 49% of the cases. A list of foods consumed regularly and those consumed during the lean seasons in rural areas of the Sudan are shown in Table 2. The results of the survey indicate that rural people eat a range of processed and preserved foods regularly and in times of seasonal shortages. Indigenous fermented and dried products are the base ingredients to a variety of sauces and stews eaten with *ascida* or *kisra*. *Kisra* (traditional flatbread) and *ascida* (stiff porridge) are prepared from fermented sorghum or pearl millet flour (dough) or their mixtures depending on the geographical location and ethnic background.

Table (2): regular and irregular foods diets in rural Sudan

Rural Areas	Regular foods diets	Eaten regularly and particularly during lean season
Western Sudan	Acida (fermented sorghum or pearl millet flour stiff porridge) is usually served with diverse stew made of fermented-dried meat or bones (or substitute for meats i.e. seeds, wild products, etc) and/or salted and spiced and dried vegetables or sour milk, with onions, traditional gee (semin) and indigenous tomato sauce	♣ Substitutes for the meat are indigenous fermented foods kawal (fermented and sundried of leaves of <i>Cassia obtusifolia</i> (Sicklepod), sigda (fermented of seedcake remaining after oil extraction from sesame seed (<i>Sesamum orientale</i>), and furundu (is prepared by cooking the seeds of hibiscus (<i>Hibiscus sabdariffa</i>) and then fermenting for more than a week. ♣ Bajbaji is stiff porridge made from dried watermelon seeds ♣ Fresh bones are fermented in a number of ways ♣ Um-zummatah made by fermentation of watermelon juice

		♣ Indigenous fermented dairy products (roob, mish, samin, etc)
Eastern Sudan	Kisra (flatbread prepared from fermented sorghum flour) is usually served with very diverse indigenous stew made from cooked dry okra, curdled milk, fermented seafood or dried-spicy meat or vegetables are usually poured over kisra	♣ Mindeshi is minced small fish paste, fermented, and may be dried later ♣ Mish (spiced traditional yoghurt) ♣ Mokhbaza (banana paste)
Northern Sudan	Groasah a thick bread from wheat flour is usually served with very diverse indigenous stew made from dried meat, tomato sauce and dried okra, or fermented fish, or sour dairy products and in addition to organic fresh vegetables, fruits and date	♣ Fessiekh and maluha/terkeen are types of wet-salted fermented fishery products ♣ fermented milk products such as roob is a traditions home-made yoghurt and traditional gee called locally samin
Southern Sudan	Acida (stiff porridge) prepared from fermented sorghum flour Sorghum and corn served with fermented fish, meat, cassava, honey and vegetables	♣ Duma is made by fermenting diluted honey and is unique to this area ♣ Kejeik is hard fermented sun-dried fish
Nomads	Camel milk and its products either fresh or sour and meat from camels are the staple nomads diet supplemented by cereals	♣ Soured milk ♣ Kush-kush is a type of a grainy indigenous cheese made from fermented camel milk

Data for this table are derived from the researcher field surveys in different rural areas of western Sudan (key informant interviews were used in 2013)

A variety of fermented dairy products is usually made by using the traditional procedures at home, in some cases without using a starter culture. Rural women indicate that animal products are processed to make products with long-storage life, such as *roob*, *samin* and *mish*. A report by the Arab Organization Agricultural Development (AOAD, 1983 cited in Abdelgadir, et al. 1998) estimated that 65 % of fresh milk produced in Sudan is turned into dairy products. Dirar (1993) gave an estimate of 50–60 percent fermented milk products, as an offhand estimate. Processed and preserved food items contribute to sustain household food supplies and more importantly to diversifying of household consumption and thus enhance its nutritional wellbeing.

Other possible sources of stability of household food supplies:-

Attaining food security is one of the key determinants of nutritional status of individuals (Babu and Sanyal, 2009, p. 7). Substitute sources like tree products, uncultivated wild plants food products, etc. represent alternative food resources available for households in rural Western Sudan. Home gardening, domestic animals rearing and post-harvest activity traditionally considered women's domain. Diverse food items from family farms, animal and home-garden products, contribute to increased food sustainability (Pretty, et. al. 2003, p. 223). Rural women dominate home garden production in Western Sudan (Ahmed, 2000). Backyard plots play a role in attaining family food security and considered women's plots in most rural Sudan. The variety and quality of homestead production contributes to the diversity and sustainability of the family diet. Quick-maturing crops produced at home garden, such as okra, cucumber, beans, provide families with their daily nutritional needs when the household grain stock is low in pre-harvest season. Products like okra (*Hibiscus aesculentus*) and beans (*Lupinus termis*) are consumed fresh and the surplus is dried and preserved for years.

Wild species widely grown in the rural Sudan and their products represent foods ingredients integrated into people diets and as substitute for other food items during food shortages. The collection of wild species such as *kawal* (*Cassia obtusiflora*) and green leafy vegetable (*Sonchus* spp.) is women's responsibility with the help of children as indicated by respondents. These uncultivated wild food products contribute to household food consumption, either fresh or processed. Women dry *Kawal* and then fermented from green leaves of the *Cassia obtusifolia* legume

(Ibnouf, 2012, p. 242). Wild green leafy vegetable (*Sonchus* spp.) are consumed fresh in rural Sudan. Salt, groundnuts butter, tomato, onion, and oil are add to (*Sonchus* spp.) to enhance taste. Traditional leafy vegetables contribute significantly to household food security and add variety to cereal-based staple diets (Uusiku, et al. 2010). Wild foods were documented by some research findings as being nutrias foods rich in vitamins and minerals (Oniang'o, et al. 2004).

Safe household drinking water and traditional water purifying system :-

Piped potable water is not available in most areas of rural Western Sudan. Rural people rely on wells and surface water sources as their source of fresh water. Water is perhaps the most important nutrient in the daily diets. Responsibility for providing drinking water falls on women. Pinstrup-Andersen (2009, p. 5) stated that if nutritional security is the goal of interest, estimates of access to food should be combined with estimates of access to clean water. According field experiences in rural Sudan majority of women still rely on indigenous techniques and practices for purifying and storing drinking water. These indigenous practices have the the potential to decrease incidences of a variety of waterborne diseases. Women use natural treatment methods (*Moringa* seed powder or type of soil contains aluminum sulfate naturally “known as *alum*”) as alternatives to conventional chemical treatment methods to remove turbidity from drinking water. Women in rural areas surveyed indicate that to safe storage of drinking water and for cooling after collection they usually stored water in *zir*. Traditional water storage container (*zir*) is a large earthenware jar in the form of an amphora and water is usually withdrawal with a cup from the top (see Fig. 6). In study conducted by Mintz, et al. (1995) to assess the impact of modifying traditional design *zir* to decrease of contamination. They found that water in the *zir* with a faucet at the bottom and tightly fitted lid remained uncontaminated even after one month. Thus, women in rural Sudan play a leading role in provision secure and safe fresh drinking water to household.

Fig. 6: Traditional storage tank of a water purifying system



Women role in ensuring household food security and improving its nutritional quality:-

Findings of this study indicate that women's subsistence farming activities, their skills and knowledge in preparing, processing, and preserving foods, and their role in provision alternative food sources are essential in sustaining household food supplies. However, food security is a multi dimensional development concept that involves nutritional sciences, economics, and political, social, cultural, and ecological issues. Nutritional security involves the household's access 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, so the indicators of food security are household food availability, household food consumption and nutritional status (Mittal, 2006, p. 16). Food must meet cultural preferences and be safe (Sutherland, et al., 1999, p. 365). Therefore, there is a need to consider women role in provision adequate diversity of food for household to ensure adequate nutrition levels, and where possible contribute to household nutrition security. Nonetheless, this study indicates that responsibility for nutritional food quality rests in the hands of the food processors and providers and since women are responsible for food preparation and processing, they contribute more to food nutritional quality, than men do.

Contribution of men and women to their household nutritional status:-

Household food security is an important measure of their health and well-being and universally used to design nutrition interventions in rural and low-income areas (Hoddinott, J. and Yohannes, Y. 2002). This study has established that rural women play crucial roles in improving household nutritional security in relation to their male counterparts. Women are more likely to employ locally accessible resources to enhance their family nutritional status than men are. Through agricultural and livestock products, processed and preserved as food products, a variety of home-garden products, and uncultivated wild species, women contribute to diversifying of household consumption. Through such practices, women enhance their holds nutritional wellbeing. Studies from developing countries confirm positive associations between dietary diversity and nutrient adequacy (Ruel, 2002). Dietary diversity can serve as an indicator of the nutritional sufficiency of the diet and positively associates it with overall nutrient adequacy intake (Onyango, 2003, p. 67).

Decisions about what food to cook each day:-

Women find ways to control their family nutrition status through decisions over food selection, preparation, processing and preservation, and quantity and quality of the daily food consumption (Maxwell, 1999; Hyder, et al. 2005). These findings are consistent with research conducted by Muneer and Mohamed (2003, p. 259) in rural Sudan, which states that in the Sudanese patriarchal society all the household domestic tasks, particularly food preparation and related activities, are considered women's responsibilities and all the decisions related to them are taken by women. Similarly Schafer, et al. (1999, p. 794) found that in spite of changes in gender roles and an increase in women's employment outside the house women continue to take major responsibility for household tasks including food selection and preparation. In all societies, women are the ones typically expected to make decisions about what their families to eat. Four out of five rural women in the study areas reported they make decisions concerning their households' food preparation and dietary choices. While two out of five women responded that they make decisions about what food to cook each day jointly with their husband or/and other family members. Male household members (husband, father, brother, and other closed relatives) rarely make these decisions. But in few cases, it is regarded as the women duty to satisfy the desires of the male members of household and cook what he desires most. Family eating habits may change to meet the preference of household's male members (Wong, et al. 2005). Nonetheless, this study argues that rural women are exclusively responsible for selecting and preparing food for their households and thus for the nutritional security of her family members.

The question of intra-household food allocation is very important, particularly in its gender dimension. Woman is in absolute control of the food allocation as they decide who gets what, when, and how much. However, within the household there are cultural factors, which control the allocation of food among household members. In case of food serving and consumption in rural Western Sudan, as in many African cultures, men are privileged over children and women. In the rural areas surveyed data indicated that 48% of men eat, first and 79.3% get the best food available and then children and women. Hyder, et al. (2005, p. 330) in their studies in Tanzanian and Kenyan found unequal pattern of food distribution between genders and age groups of household members. The study findings revealed that feeding practices are not based on the role that each family member plays in securing household food supplies.

Conclusion and Policy Implications:-

The study argues that rural women are using locally available diversified food resources to sustain their household's food supplies and thus achieving household food security more likely than men achieve. The role of rural women in this context can greatly be enhanced and empowered through adoption of supportive national policies and rural development programs.

The findings of the study lead to a number of policy implications:

- Progress towards achieving food security and reducing hunger requires policies that focus on raising the productivity by finding solution of unsolved problems of rural women as food producer. Although there are, some programs focused towards uplifting women's status, apart from the many general poverty reduction programs. None of these programs was gender sensitive in essence, instead, they all tended to be gender-neutral. Nonetheless, challenges persist in the interpretation and implementation of these policies resulting in women. It is now high time to develop implementable and workable food security programs and policies that put gender concerns at their focus.
- With respect to local and indigenous cultures, traditional knowledge need to be incorporated in natural resources management and make it part of the environmental policies. As women are the mainly subsistence producers and users of natural resources, it would be useful to recognize and integrate women's indigenous knowledge in the conservation and management of these resources to ensure their sustainability.

- Women's indigenous knowledge forms a valuable resource in processing and preserving of raw materials in times of abundance for times of scarcity in the rural Sudan. There is a need for investigating and considering local food practices, which based on indigenous knowledge to help in achieving reconciliation between development programs, policy interventions, and actual practices.
- The lack of national sex-disaggregated data, which has been and continue to be a serious problem for the analysis of many gender issues (i.e. men/women poverty). If policymakers cannot track what is happening to both genders, they miss key information that will lead to effective policy.
- Sudan Western States governments need to reform and narrow their focusing on the integration of policies according to the needs and situation of their rural populations, not according determined standards from the central national institutions. The overall cultural contexts of rural communities and the culture-specific facets of their varied constituencies have been ignored by such policies, with the result that it has never been fully accepted by these indigenous people. This requires assessing the implications for rural women and men on any planned policies in order to make their respective concerns an integral dimension of the whole policies implementation.
- National and States governments need to build skills acquisition centers where women find chances to be trained in various skills in non-formal education settings. Graduates from these centers may be given equipments freely as a means of ensuring that skills acquired put to use to generate income for various families; this will enable rural women to be self-employed.

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