

Gender, Energy and Environment Nexus in Female Farmers Household Energy Management in Gombe State, Nigeria

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ABSTRACT This study examined the role of female farmers in household energy management in Gombe State of Nigeria. The study demonstrates that gender roles are culture derived where fuel wood is primarily used as fuel for cooking and females were exclusively responsible for its collection. Females were equally responsible for taking decision among 62.2% in the cooking energy system. Therefore, a key factor in moving up the energy ladder would be tackling the cultural barriers via the "location specific" approach. Constraints to efficient and effective rural energy management identified were declining access to energy sources that is worsened by inadequate access to education, credit, income, time and contact with extension service. This is further segregated by the distinct roles played by male and female farmers in the total energy management system. To profoundly ameliorate the time and energy available to farmers for both productive and reproductive tasks, extension professionals and policy makers alike should seriously consider in concrete terms policy initiatives, projects design and implementation the multiple roles of female farmers and the responsibilities, tasks, expectations and constraints associated with such challenging roles.

INTRODUCTION

Empirical evidences abound that, in the entire African region and the developing countries of the world, women are the users, collectors and managers of household fuels especially biomass (Boserup, 1970; UN, 1975; Cecelski, 1987; German Appropriate Technology Exchange (GATE); 1997 and Sona, 1998). However, due to a variety of reasons, women's managerial role in rural energy system is being neglected. Women are obscure even in the government initiated rural energy interventions (Sona, 1998).

In a similar submission, gender differences in the allocation of resources and sharing of responsibilities have been shown to be significant. However, policy makers suffer from chronic gender blindness, that is, they are unable to see that there are different gender roles and responsibilities (Imam, 1990). In addition they believe that domestic energy managers are men and technology is only for them. Such policy makers fail to realize that project activities can have different effects on males and females (Heyzer, 1992)

In Nigeria, guidelines for the design and evaluation of projects sensitive to women's roles have often been applied only to a narrow range of women's project. Much of the existing data is aggregated on societal level, differentiated only

by rural/urban or the community or household level (Boateng, 1994). Effective policy making rest on accurate and up to date information. Therefore there is need for gender aggregated data in rural energy management which is vital for policy reforms aimed at the removal of gender specific constraints.

This paper is therefore an enquiry into the role of female farmers in household energy management. In particular, it seeks to identify their specific tasks, decision making roles at the family and societal levels and sources of energy. The paper also determined the socio-economic characteristic of farmers. Hence, it established based on empirical evidences the implications of gender, energy and environment interface for research, extension work and governmental policy on rural energy systems in particular and socio economic life in general .

METHODOLOGY

The data for this study were obtained from a random sample of three hundred female farmers from the districts that constitute Kaltungo Community in Gombe State of Nigeria. It is situated in the northern guinea savannah at longitude 11.30¹ to 11.40¹ East and latitude 9. 30' to 10. 30' North. It has short rainy season starting from June to October and the dry season of more

than six months. The rainfall averages 1600mm. The soil type is solid –drift soils low in nutrients (Ezenwa, 1986).

A sampling frame, consisting of names of 1,500 registered female farmers was obtained from the Women –in- Agriculture (WIA) unit of Kaltungo Agricultural Development Zonal Area Extension unit. Using a simple random procedure, about 30% of registered female farmers were selected. A designed questionnaire covering specific study variables was administered to the respondents.

Descriptive statistics – frequencies and percentage were used to analyse data collected.

RESULTS

As revealed in table 1, five variables – experience, educational attainment, income, status in household and contact with extension agents were considered in the socio-economic characteristic of female farmers studied. Age distribution of respondents indicates that 85% of the respondents were 18-50 years; the modal category was 41-50 years with 33.3%, while another 28.6% falls within 31 and 40 years of age. The farming and household and household energy management experiences were considered in terms of how long farmers have been farming and managing household energy system. As shown in table 1, majority of the respondents are well experienced where 40% have over 30 years experience, while 33.3% have 21-30 years experience in farming and household energy management.

The literacy level of the sampled farmers in the study is generally low. As shown in table 1, 74% of the respondents have no formal education. This group consists of non-literate (21.33%); adult literacy (16.67%); primary and secondary drop outs (26.00%). Only 26% had formal education, ranging from primary and secondary and teachers college. Status of female farmers in households revealed that 46% were heads of household while 54% were not. Majority of the female farmers 87% had income levels below ₦5000 on the average and 60% had no contact with extension agents.

In Table 2, lists of various activities involved in household fuel preparation and delineation on the basis of gender are reflected. Fuelwood cutting, collection head loading of fuelwood, processing, storage and sales are primarily the task of females in the study area. They are also exclusively responsible for cooking food. Fuelwood is the primary source of fuel in the area.

Table 1: Socio-economic characteristics of respondents

Variable	Frequency	Percentage
<i>a. Experience in Farming and Household Energy Management Practices (years)</i>		
1-10	30	10.00
11-20	50	16.67
21-30	100	33.33
< -31	120	40.00
Total	300	100.00
<i>b. Educational Attainment</i>		
Non-literate	64	21.33
Adult literacy	50	16.67
Primary uncompleted]	43	14.33
Primary completed	60	20.00
Secondary uncompleted	35	11.67
Secondary completed	16	5.33
Teachers College	32	10.67
Total	300	100.00
<i>c. Gender of heads</i>		
Female headed	138	46.00
Male headed	162	54.00
Total	300	100.00
<i>d. Average Income Per Annum (N)</i>		
<1000	110	36.57
1000-2999	100	33.33
3000-4999	50	16.67
<5000	40	13.33
Total	300	100.00
<i>e. Contact with Extension</i>		
Head contact	120	40.00
No contact	180	60.00
Total	300	100.00
<i>f. Age Distribution</i>		
Under 21	29	9.70
21-30	40	13.30
31-40	86	28.70
41-50	100	33.30
>50	45	15.00

For the purpose of analysis, the cooking energy system was selected because it reflected the highest demand for energy (60%) (Table 3). This was operationally defined to constitute six (6) linked subsystem such as cooking area, fuel for cooking, device vessel for processing, meal planning, cooking of food and money. The study enumerated the key decisions made with regards to these where both males and females were involved in taking decisions. The mean response for decision taken in relation to all the six linked sub-system in the cooking energy system stood at 19 % for males, 62.22% for females and joint decision for both males and females at 18.7%

Farmers' decisions are outstandingly influenced most by their culture/tradition. The influence of culture/tradition was strongly felt by respondents in all the six-linked sub-systems (Table 4). For instance, farmers' decision on

Table 2: Activity matrix in household fuel management

<i>Fuel</i>	<i>Fuelwood</i>	<i>Gender</i>	<i>Crop-Residue</i>	<i>Gender</i>	<i>Animal Dung</i>	<i>Gender</i>
"Tul wi) (Source) <i>pidei</i> "Kashi/Keri"/Kadi (Procurement) "Yedi"/ Tible (Processing) "Wuteni" (Use)	Natural resources		By-product of farming activity		By-product of cattle feeding	
	Cutting/Collecting	♀	Collection head	♂	Daily collection	♂
	Head loading	♀	loading	♂	Making dung cakes	♂
	Chopping/Storage	♀	Chopping/ lighting	♂	Warming/ lighting	♂
	Cooking food	♀	Bush meat smoking	♂	Local beer brewing	♂
	Meat/ fish/ Smoking	♀	Local beer Brewing	♂	Room heating	♀
	Local Beer	♀	Room Heating	♀	Sales	♀
	Brewing	♀	Sales	♀		♀
	Room Heating	♀				♀
	Sales	♀				♀

Key ♀ "Wuten Worop" – (Activity typical carried out by female)
 ♂ "Wuten Wana" –s (Activity typical carried out by males)
 ♂♂ "Wuten Worop ga Wana dodk-dodok" (Males and Females Play distinct role)
 NB Word in Italics –Po-Tangle (Cultural Dialect Spoken in the study area)

Table 3: Decision making process in farmers' households.

<i>Cooking Energy System</i>	<i>Typical Decision Made</i>	<i>Person Making the</i> ♂	<i>Decision by</i> ♀	<i>Gender %</i> ♂+♀
1. Cooking area p	Planning/design/location	50	20	30
	Construction equipments	60	20	20
	Kitchen equipment	71.67	8.33	20
	Kitchen arrangement	73.33	6.67	20
	Kitchen hygiene	20	60	20
	Fire places/stove	20	46.67	33.33
		-	100	-
		-	100	-
		-	100	-
2. Cooking fuel sum wi	Which fuel to use	-	100	-
3. Device vessel for processing and cooking <i>wamu wuten</i>	Devices/vessel to use	19.33	20.67	60
	Size	10	60	30
	Shape	6.3	89.7	4
	Material	8.3	86.7	5
	Number	30	40	30
4. Planning meals <i>sama saana</i>	Kinds of food	7.33	76.67	16
	Daily meals	20	53.33	26.67
	Quantity	-	100	-
	Purchases	30	20	50
	Preservation	-	100	-
	Storage	20	26.67	53.33
5. Cooking food <i>din saana</i>	Person to cook	-	100	-
	Quantity to cook	-	100	-
	Cooking methods	-	100	-
	Person to serve food	-	100	-
6. Money <i>king</i>	Who controls finance	30	20	50
	Mean (X)	19.05	62.22	18.73

Key ♂ "Wana" -Decision taken by males
 ♀ "Worop" - Decision taken by females
 ♂+♀ "Worop ga Wana"-Decision taken by both males and females
 Source: Field Survey

finance was overwhelmingly influenced (100%) compared to other variables in the subsystem like cooking food, cooking fuel and planning meals were influenced at 36.6%, 33.3% and 31% respectively by culture.

The study demonstrates that most of the farmers in the area are youths that could undertake tedious tasks of farming and rural energy supply. Farmers were either pregnant or lactating showing that child rearing goes hand in hand with agricultural and rural fuel supply. According to National Population Bureau (NPB, 1998) age specific fertility rate (ASFR) and percentage contribution to birth for the majority (18-40) is 87%. This implies high fertility rates. In the rural areas characterized by traditional, poor technologies and high incidence of brawn power, the age factor becomes very vital when available supply of human labour is considered; under such a situation one expects that young farmers will be in a better position to be more productive ultimately. Also they are believed to be less

fatalistic in their decision, adopt new ideas more readily than the elderly. On the other hand, it is expected that the elderly would possess a greater insight and understanding of the historical background of cultural roles of females and certain household energy management practices. Age has been reported to influence positively or negatively the use of technology. Adekunle and Nabinta (1999) reported a negative correlation. This suggests that young farmers adopted more agricultural energy and other technologies than the elderly. But Kuma and Wasnik (1990) found a positive correlation between age and adoption. This suggests that as one grows older, so also the person's responsibilities and commitments. Hence, adoption of innovations to satisfy the domestic expectations or responsibilities effectively becomes imperative

Majority of the respondents have long standing experience of over 30 years in household management. The implication of these findings is that the more experience a farmer is in household

Table 4: Decision making process in farmers' households.

<i>Cooking energy system</i>	<i>Typical decision made decision making</i>	<i>Factors influencing</i>	<i>Percent of total</i>
1. Cooking <i>pidi dip saana</i>	Planning/design /location/site Construction material Construction Kitchen equipment Kitchen arrangement Kitchen hygiene Fire places/stove Which fuel to use	Culture/Tradition Affordability Availability of Materials Ease of construction	33.3 30.0 24.7 14.1
2. Cooking fuel <i>sum wi</i>		Culture/Tradition Availability Family size Affordability	33.3 28.4 24.0 14.3
3. Device vessel for processing and cooking <i>wamu wuten</i>	Devices/vessel to use Size Shape Material Number	Culture/Tradition Affordability Task suitability Fuel type Preference	30.3 21.0 18.0 16.7 14.0
4. Planning meals <i>sama saana</i>	Kinds of food Daily meals Quantity Purchases Preservation Storage	Geographic condition Culture/Tradition Affordability Family size Food habits Nutritional knowledge	31.0 22.0 13.0 13.0 12.0 8.0
5. Cooking food <i>din saana</i>	Person to cook Quantity to cook Cooking methods Person to serve food	Culture/Tradition Family size Food habits Nutritional knowledge	36.7 30.0 20.0 13.3
6. Money <i>king</i>	Who controls finance	Culture/Tradition	10.0

energy management the greater is her output. The efficiency and effectiveness of long standing domestic energy managers could be due to trial and error.

The response patterns with respect to age and educational attainment reveal that majority of the respondents have poor education background as well as low income. The educational attainment and good income reduce the changes of being poor, increase her productivity and enhance her skill and ability to understand and evaluate information on new techniques and processes being disseminated through extension. Thus educated farmers are likely to accept new innovations than the uneducated. Adekunle and Nabinta (1999) held the same view, the level of farmers education is related to the level of innovation he/she adopts.

Majority of households were headed by males. Nevertheless this does not interfere with household fuel supply in the study area. All farmers reported that when it comes to the issue of fuelwood procurement and management, males do not interfere or place restriction even in households headed by them. This implies that males in the study area have fully accepted the cultural role of females as that of traditional energy managers. This finding is similar to CBN/ World Bank (1999) submission that reported most households in Nigeria are headed by males.

The study reveal further that none of the respondents obtained external help in the form of credit or loan from bank or ministry. It could be inferred that farmers in the study area depend on the informal sector for credit. This study confirms William's (1998) assertion that rural women seldom have access to formal credit institutions. This is corroborated by (FAO, 1999) that reported how rural women dominate the informal saving market both as savers and lenders.

Majority of the respondents have no contact with extension agents. Therefore, it could be asserted that farmers in the study area utilize mostly information within their culture. No wonder it was observed during the survey that very few women were found using modern energy technologies.

As indicated in the study, males and females play very definite roles prescribed by culture and females were actively playing leading roles in rural energy production and utilization, which is basically fuelwood. This study agrees with Popoola (1992) that reported rural dwellers sole

dependence on traditional fuelwood supplies for their energy requirements and its procurements and processing are largely activities undertaken by females in developing countries.

Findings also reveal that, farmers decisions are guided by their traditional decision making structure in the area that spells definite roles and functions for males and females where females have greater responsibilities in Household Energy Supply (HES) and utilization. This study agrees with Boserup (1970), UN (1975) and Williams (1998) that indicated greater workload for females than males in rural energy supply, agriculture, and domestic activities that are traditionally shared.

Natural laws governing the existence of male and females alike as universal and cannot be altered but cultural laws are man-made and in favour of men. Gender as defined in this study is male and female behavioural norms and social roles, not universal or natural, but learnt or acquired and varies from one society to the other, and has altered over time. On the other hand sex is universally accepted biological difference between men and women. Culture is a way of life of a people, comprising their attitude, values, beliefs and lifestyles and varies from one society to the other.

Gender roles are invented culture that is man-made. Mostly females are the creators and custodians of culture and the major socialization agents in the society (Nigeria Labour Congress NLC, 2003). This implies that females must be taken into account when cultural change is the goal and must be location specific. Also women themselves must be willing to change the status-quo

There is need for female farmers in the area to be effectively and efficiently mobilized and soundly motivated by their female counterpart, the Women In Agriculture (WIA) extension arm to recognize that cultural prescriptions and gender roles were invented by them and that they can change them for the benefit of both males and females in families and society at large. Gender role should be action-user friendly.

As noted in Table 3, financial and public matters lie within the male domain. This implies some form of hindrances. Women may have little or no financial liberty. Also their issues may not be voiced in public.

Next, to the influence of culture, female farmers, decisions were influenced by their economic status.

CONCLUSIONS AND RECOMMENDATIONS

Attempts have been made in the study to analyze the roles of female farmers in household energy management. The study showed that females have the central or exclusive responsibility for supplying household energy the source of which biomass (fuelwood) predominates. Thus females play significant and dominant role in the household energy system (HES). Majority of the respondents were experienced but limited in education and access to extension services. Credit facilities that would have removed financial constraints and enable farmers to purchase modern agricultural and energy technologies were equally limited.

In view of the above findings, the following recommendations were made to enhance the role of women, build their capacity and empower them:

1. Education of female farmers is the baseline on which all other resources are predicated. Proper attitude, knowledge and skills through education will go a long way to enhance their roles and productivity. Therefore intensive grassroots awareness campaigns through extension, mass media campaign and adult education programmes in the country should be organized to tackle seriously and urgently, the general problems of low educational attainment of female farmers
2. Poor income adversely affect female farmers productive and reproductive tasks and poses as a major constraint to maximizing benefits of extension services to female farmers. Also, their level of economic independence should be improved through locating sources of credit for rural women and encouraging them to form cooperatives for credit purposes via intensive enlightenment campaigns. Community Banks, People's Banks and the Nigeria Agricultural Cooperative and Rural Development Bank should play vital role in this direction.
3. Active Farmers-Extension Interaction (FARINEX) is required in the study area. Government, Extension and Non-Governmental Organizations should promote Environmental and energy programmes and measures to substitute deleterious cultural practices through the mass media, popular culture, formal and non-formal education.
4. Females and especially in the study area should be recognized as vital instruments for

solving the energy crisis and giving women greater role in the design and implementation of energy programmes and making the best use of local knowledge will enhance steady progress up the energy ladder.

5. Government should create enabling environment to enhance the development and dissemination of biomass energy technologies. Technology design should be gender sensitive in order to increase the effectiveness of the energy programmes such as environmental concerns.

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