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### Examination of gender specific roles in sustainable land use, water management and agricultural productivity in Southern Kebbi state

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#### Abstract

This study examined gender specific roles for men and women in sustainable land use, water management and agricultural productivity in southern Kebbi, Nigeria. The specific objectives were to: describe the socio-economic characteristic of men and women in sustainable land use, water management and agricultural productivity; assess the role of men and women in agro-inputs business; and identify the constraints to sustainable land use, water management and agricultural productivity in the area. Data for the research were obtained from forty eight (48) respondents who were actively involved in land use, water management and agricultural productivity. This included 24 were men and 24 women which were purposively selected for the study. The result revealed that the majority (62.5%) of men and women who were actively involved in sustainable land use water management and agricultural productivity had senior secondary school education. Also, majority (81.3%) of land resources were owed by men. Self-generated income was found to be the major source of fund for sustainable land use, water management and agricultural productivity for both men and women. The types of operations carried out by the male farmers were grouped into three; such as pre-planting operations such as land clearing bush burning, tillage (rigging, harrowing etc), planting operations such as sowing, weeding, fertilizing, etc and post planting operations such as harvesting, threshing, packaging, loading/off-loading and driving, while winnowing, processing, marketing, sales and records keeping were mostly done by women (53%). Major challenges to sustainable land use, water management and agricultural productivity were high taxation (45.1%) and difficulties in sourcing foreign exchange (21.9%). It is concluded that sustainable land use and water management led to improved agricultural productivity in the study area. Agricultural policies aimed at encouraging more men and women participation in land use, water management and agricultural productivity and low taxation were recommended by the research as ways of addressing the challenges affecting men and women in the execution of their specific roles in sustainable land use, water management and agricultural productivity.

**Keywords:** gender, specific roles, sustainable land use, water management and agricultural productivity

#### 1. Introduction

The productivity and sustainability of a land-use system is determined by the interaction between land resources, climate and human activities. Especially in the face of climate change and variability, selecting the right land uses for given biophysical and socio-economic conditions, and implementing SLM, are essential for minimizing land degradation, rehabilitating degraded land, ensuring the sustainable use of land resources (i.e. soils, water and biodiversity) and maximizing resilience (Adegbidi, 2012)<sup>[1]</sup>. According to Oguntela *et al.*; (2009)<sup>[10]</sup> the international development community has recognized that agriculture is an engine of growth and poverty reduction in countries where it is the main occupation of the poor. Women make essential contributions to the agricultural and rural economies in all developing countries. Their roles vary considerably between and within regions and are changing

rapidly in many parts of the world, where economic and social forces are transforming the agricultural sector. Rural women often manage complex households and pursue multiple livelihood strategies. Their activities typically include producing agricultural crops, tending animals, processing and preparing food, working for wages in agricultural or other rural enterprises, collecting fuel and water, engaging in trade and marketing, caring for family members and maintaining their homes.

Many of these activities are not defined as “economically active employment” in national accounts but they are essential to the wellbeing of rural households. This paper contributes to the gender debate in agriculture by assessing the empirical evidence in three areas that has received much attention in the literature: But the agricultural sector in many developing countries is underperforming, in part because women, who represent a crucial resource in agriculture and

the rural economy through their roles as farmers, labourers and entrepreneurs, almost everywhere face more severe constraints than men in access to productive resources. Efforts by national governments and the international community to achieve their goals for agricultural development, economic growth and food security will be strengthened and accelerated if they build on the contributions that women make and take steps to alleviate these constraints.

Men and Women make essential contributions to the agricultural and rural economies in all developing countries. Their roles vary considerably between and within regions and are changing rapidly in many parts of the world, where economic and social forces are transforming the agricultural sector. Rural women often manage complex households and pursue multiple livelihood strategies. Their activities typically include producing agricultural crops, tending animals, processing and preparing food, working for wages in agricultural or other rural enterprises, collecting fuel and water, engaging in trade and marketing, caring for family members and maintaining their homes. Many of these activities are not defined as “economically active employment” in national accounts but they are essential to the wellbeing of rural households. This paper contributes to the gender debate in agriculture by assessing the empirical evidence in three areas that have received much attention in the literature (Mtsor, *et al.*; 2014)<sup>[7]</sup>.

Mainly rural women are engaged in agricultural activities in three different ways depending on the socio-economic status of their family and regional factors. They work as: Paid Labourers.

Cultivator doing labour on their own land, Managers of certain aspects of agricultural production by way of labour supervision and the participation in post-harvest operations. The types of agricultural activities taken up by women include the following: Sowing, Nursery management, Transplanting, Weeding, Irrigation, Fertilizer application, Plant protection, Harvesting, winnowing, storing etc. They also involve in animal related activities as: Cleaning of animal and sheds, Watering of cattle, milking the animals, Fodder collection, preparing dung cakes, Collection farm yard manure. Except grazing, all other livestock management activities are predominantly performed by women. Men, however, share the responsibility of taking care of sick animals. It is evident that the women are playing dominant roles in the livestock production and management activities. Poultry farming is one of the major sources of rural economy. The rate of women participation in poultry farming at household level is central in poultry industry (Hiroyuki, 2011).

Globally, there is empirical evidence that Men and women have a decisive role in ensuring food security and preserving local agro-biodiversity. Rural men and women are responsible for the integrated management and use of diverse natural resources to meet the daily household needs. With women predominant at all levels-production, pre-harvest, post-harvest processing, packaging, marketing – of the agriculturally value chain commodities, to increase productivity in agriculture, it is imperative to adopt gender specific interventions. An ‘inclusive transformative agricultural policy’ should aim at gender-specific intervention to raise productivity of small farm holdings,

integrate women as active agents in rural transformation, and engage men and women in extension services with gender expertise. The importance of involving both men and women in the management of water including agricultural water and ensuring equitable access to and control over water resources have been overwhelmingly recognized by the international community. Agricultural water management has been effective in increasing yields and food production worldwide. Water professionals have developed and promoted agricultural water management techniques such as rainwater harvesting and flood control. In many places, however, planners, engineers, extension staff and decision-makers still fail to perceive women as farmers. Consequently, policies, programmes and projects frequently overlook the knowledge, tasks, needs and requirements of women and other vulnerable groups (e.g. ethnic groups) in agricultural water management (Dickson, *et al.*; 2014)<sup>[4]</sup>.

In many societies, men and women have distinctly different roles in agriculture and food production, roles that are influenced by the social and economic context. Today, urbanization and outmigration of men and youth are changing roles and responsibilities. Women are increasingly taking on greater and more varied responsibilities in farming—including irrigation, managing labor and procuring inputs. The importance of women in agricultural production is increasing in most regions. Although the contributions of women to agriculture and food production are significant, women often lack formal rights to the land they farm and the water resources they need to irrigate their fields. In many regions, women suffer discrimination in land rights with respect to communal lands, which are controlled largely by men. Women also lack status in their communities to influence natural resource governance decisions and practices. According to Okello (2010)<sup>[11]</sup>, Land is an important economic and social asset. It provides opportunities for women and men to generate income and improve the overall well-being of their families and communities. It also gives standing within communities – a point that is often ignored by development programs. A detailed study of Ethiopia’s land registration program in three states concluded that registering land jointly in women’s and men’s names enhanced gender equality. However, additional effort is needed to raise awareness of opportunities to use the land more productively, facilitate access to credit and farm inputs, and strengthen men’s and women’s legal literacy.

According to World Bank (2013)<sup>[12]</sup>, access to water for irrigation and other domestic and productive purposes has large potential for bringing economic and nutritional benefits to women and men. Women make important contributions to the agricultural and rural economies of all regions of the world. However, the exact contribution both in terms of magnitude and of its nature. Rural women perform numerous labour intensive jobs such as weeding, hoeing, grass cutting, picking, cotton stick collection, separation of seeds from fiber, keeping of livestock and its other associated activities like milking, milk processing, preparation of ghee, etc. Details of activities taken up by women in Agriculture and its allied activities are as follows. Women play an increasingly greater role in agriculture. Ensuring that they have opportunities-equal to those of men-

to participate in transforming agriculture is a prerequisite for sustainable intensification. Increased gender equity in agriculture is both a practical and a social justice issue: practical because women are responsible for much of the production by smallholders; and social justice because in many cases they currently do not have rights over land and water resources, nor full access to markets, and often they do not even control the crops they produce. Strategies to promote gender equity must be tailored carefully to the social and economic context.

According to World Bank (2013) <sup>[12]</sup>, women in developing countries receive less than 10% of available credit to expand trade, such as agro- businesses. This is mainly due to lack of collateral security in rural areas. In order for women to access financial credit, government need to intervene to encourage the development of rural micro-credit institutions whose regulations are friendly to women. Intervention can be in form of accepting other forms of collateral such as machinery, furniture and any other tangibles that women own.

There is a general belief that sex inequalities issues in areas of ownership and access to productive resources such as land, education, extension services and health care which hitherto have contributed to lower employment opportunity and higher poverty levels. Given that gender matters in all domains of value chain development, which ranges from inputs supply business to production and marketing, there has been established gender issues in agricultural production. Conversely, very little is understood about gender roles on sustainable land use, water management and agricultural productivity. Spearman rank correction coefficient was used to test hypothesis of the study. Based on this, the study was design to investigate gender specific roles in sustainable land use, water management and agricultural productivity in Southern Kebbi, Nigeria; specific objectives were to:

1. Describe the socio-economic characteristics of men and women in sustainable land use, water management and agricultural productivity.
2. Evaluate gender specific roles in sustainable land use, water management and agricultural productivity; and
3. Identify the challenges confronting agricultural Men and Women in sustainable land use, water management and agricultural productivity.

### Research Questions

1. What are the socio-economic characteristics of men and women in sustainable land use, water management and agricultural productivity?
2. What are gender specific roles in sustainable land use, water management and agricultural productivity?
3. What are the challenges confronting agricultural men and women in sustainable land use, water management and agricultural productivity?

### H0- Hypothesis

There is no significant relationship between sustainable land use, water management and increased agricultural productivity

### Methodology

This research was carried out in Southern Kebbi State (Zuru

Emirate), Nigeria. Zuru Emirate is one of the four Emirates in Kebbi state. The Emirate comprises of four Local Government Areas (LGAs) namely; Danko-Wasagu, Fakai, Sakaba and Zuru. The Emirate is located within latitudes 11° and 12° N and longitudes 4° and 5° E of the equator (NPC. 2006) <sup>[9]</sup>. The state was carved out of the former Sokoto State in 1991; the Emirate is located in the extreme South-eastern part of the state and covers an area of approximately 9,000 square kilometers. It is located on a hilly terrain and is bounded to the north by Gummi Local Government Area of Zamfara State, North-west by Koko Local Government Area, South-west by Yauri Local Government Area, North-east by Bukkuyum Local Government Area of Zamfara State and south by Rijau Local Government Area of Niger state (Girma, 2008) <sup>[5]</sup>.

The estimated population of the Emirate is 582, 106 people (NPC, 2006) <sup>[9]</sup>. The various indigenous cultural and ethnic groups of the Emirate are the Dakarkari, Fakkawa, Dukkawa, Kelawa, Kamarawa, Katsinawan laka and Achifawa. Other nonindigenous ethnic groups in the area are the Hausa, Fulani, Yoruba, Igbo and other tribes found in Nigeria. The different religions found in the area are Islam, Christianity and traditionalist, like any other African society, these came as a result of the interaction with the outside world (NPC., 2006) <sup>[9]</sup>. However, the traditional worship of different deities is still upheld in the area with many festivals celebrated at various times of the year. The weather is marked by a single rainy season and long dry season, the average rainfall of the area is between 1025mm and 1050mm/annum. Mean temperature range between 31°C and 38°C, the rainy season is between April to October. The climatic condition of the area is characterized by hot and wet seasons as in the tropics; the months of November to February are the hamattan period. The soil type is sandy loam and rich, which makes it suitable for agriculture (NPC. 2006) <sup>[9]</sup>. It is important to point out that production of agricultural goods in pre-colonial Zuru society was geared mainly towards the production of use-values. This is not to say that exchange did not take place. There was exchange between the produce peasant families and commodities of non-peasant households who specialized in the production of agricultural implements and other necessities which were fundamental in the working of family units. Animal husbandry was practiced side by side with crop production, even though on limited scale. The people of Zuru Emirate depend largely on the pastoral Fulani for meat, milk and butter. Hunting was the second important economic activity after crop production. Hunting was regarded as a supplementary occupation and was carried on throughout the year because it provides a means of getting meat for consumption. It also serves as a source of obtaining skins of animals for shoes, warfare robes and for making local drums. Other important economic activities are local handicrafts like pot-making and weaving by women and blacksmithing by men (NPC, 2006) <sup>[9]</sup>.

### Result and Discussion

#### Socio-economic Characteristics of Men and Women Land Users

Table 1 indicates that most of the respondents were male 81.3% reflecting that agricultural land users' were responsibly male profiting to cater for the wellbeing of their

family. The findings is in agreement with Ogunlela and Mukhtar (2009) <sup>[10]</sup>, who reported that women in the rural areas had very limited access to marketing of agro-chemicals and reproductive resources. The findings also revealed that most of the respondents 56.3% were between 31 – 40 years of age, indicating that the female land users were headed by men in their active age. Only 10.4% were above the age of 50 years. Educational level of the respondents’ showed that more than half of the respondents’ 62.0 % had secondary education. This was followed by those with tertiary level of education, representing 20.8%. According to Ayansina, (2011) <sup>[2]</sup>, small-scale resource-poor farmers in Nigeria are either non-literate or have low level of education. Extension messages should therefore be prepared with the intent of taking care of all and sundry involved in a particular Programme of development. Level of educational attainment can enhance the capacity of the sustainable land users to access relevant information on inputs usage and marketing of agricultural commodities (Kotze, 2003) <sup>[6]</sup>. Similarly, majority of the land users 52.0% sourced their funds for agricultural production through personal savings. Those who source through sales of farm produce constitutes 22.9%, while those sourced from cooperative societies representing only 6.3% of the respondents.

**Results and Discussion**

**Table 1:** Socio-Economic Characteristics of Men and Women Land and Water Users

Variable	Percentage (n=100)
<b>Sex</b>	
Male	81.3
Female	18.7
<b>Age (years)</b>	
Less than or equal to 20	4.1
21 – 30	12.5
31 – 40	56.3
41 – 50	16.7
Above 50	10.4
<b>Educational level</b>	
Non formal education	4.2
Primary education	12.5
Secondary education	62.5
Tertiary education	20.8
<b>Sources of funds for Sustainable land use</b>	
Sales of farm produce	22.9
Loan	14.6
Personal saving	52.0
Parents/Relatives	4.2
Cooperative Societies	6.3

Source: Field Survey, 2019.

**Role of Men and Women in sustainable Land use, water Management and Agricultural productivity**

Table 2 showed the level of participation of respondents by gender in sustainable land use, water management and agricultural productivity. The table indicated that 81.3% respondents were into harvesting of agricultural produce, 18.7% were discovered to be involved in operating farm machines, 67.5% participated actively in land clearing, 64.8% were involved in burning debris prior to planting, 35.2% were into tillage practices 73.2% actively involved in

threshing agricultural commodities,70.0% obtained and applied fertilizers on their farms,89.9% practiced sustained weeding of their crops and 30.0% engaged in packaging processed agricultural output.

From the results, it is apparent that male farmers played significant roles in weeding agricultural crops (89.8%), harvesting agricultural produce (81.3%), threshing of harvested crops (73.2%), fertilizer application (70.0%) land clearing and bush burning activities. These activities led to improved agricultural productivity. This implies that men dominated sustainable land use activities, water management and subsequently improved agricultural output in southern region of kebbi state and beyond. Similarly, it is also clear from the results that female farmers (10.2%) were into livestock rearing venture, (83.5%) were involved in sowing of agricultural seeds, (52.9%) were extensively involved into winnowing especially cereal crops, (82.8%) actively participated/involved in processing harvested agricultural produce, (10.7%) engaged in milking activities, (81.0%) were into marketing of agricultural produce, (42.4%) engaged in transplanting activities, (39.5%) were into low land irrigation activities and only (51.7%) prominently engaged in weeding activities. The findings is in agreement with the findings of Mtsor and Idisi (2014) <sup>[7]</sup> which stated that women are mainly involved in the production, winnowing, processing and marketing of such food crops as maize, rice, cassava, yam and palm oil, they are rarely connected with agro-inputs trading.

Sustainable land use, water management and agricultural productivity are interwoven and when adequately utilized by both men and women could lead to improved agricultural productivity.

**Table 2:** Role of Men and Women in Sustainable Land Use

Variable	Percentage (n=100)
<b>Men</b>	
Harvesting	81.3
Operating Machines	18.7
Land Clearing	67.5
Bush Burning	64.8
Tillage	35.2
Threshing	73.2
Fertilizer application	70.0
Weeding	89.8
Packaging	30.0
<b>Women</b>	
Keeping Livestock	10.2
Sowing	83.5
Winnowing	52.9
Processing	82.8
Storage	47.1
Milking	10.7
Marketing	81.0
Transplanting	42.4
Irrigation	39.5
Weeding	51.7

Source: Field Survey, 2019. \*Multiple responses were recorded

**Perceived Men and Women Disparity in Sustainable Land Use, water management and agricultural Productivity**

Result in Table 3 showed that the majority of the men and women indicated a lot of differences on the methods of land

use, water management and agricultural productivity by gender. 64.6% of land use activities were carried out by men as compared to 35% by women. Almost all 89.6% of men and women made adequate usage of agro inputs in sustainable land use, water management and agricultural productivity. However, a lot of disparity existed between men and women on their agricultural output in which 41.6% for men and 58.3% for female respectively were their output as found out by the survey.

**Table 3:** Perceived disparity in Land Use, Water Management, Agro-input use and Agricultural output by gender

Variable	Percentage (n=100)
Differences in Land Use by sex	
Yes	64.6
No	35.4
Disparity in water management	
Men	83.3
Women	16.7
Use of Agro-inputs	
Yes	89.6
No	10.4
Disparity in agricultural output	
Men	41.6
Women	58.3

Source: Field Survey, 2019.

**Challenges Confronting Sustainable Land Use, and Agricultural Productivity**

Table 4 reveals the challenges confronting sustainable land use, water management and agricultural productivity in which majority 45.1% of the respondents indicated mode of land acquisition as the main constraint affecting sustainable land use, water management and agricultural productivity in the study area. While 21.9% indicated financial constraints as a factor affecting sustainable land use, water management and agricultural productivity. Similarly, 18.2% of the respondents saw inadequate agro-inputs as constraint affecting sustainable land use, water management and agricultural productivity. The findings may not be unconnected with the issues of the problems of pests and diseases facing both crop and animal productivity, the challenges confronting sustainable land use, water management and agricultural productivity. Empowering men and women requires transformation in the way governments devise budgets, make and enforce laws and policies on sustainable land use, water management that may stimulate small and medium, entrepreneurs’, including agro-inputs business.

**Table 4:** Challenges confronting sustainable land use and agricultural productivity

Variables	Percentage	Rank
Mode of Land Acquisition	18.2	3 <sup>rd</sup>
Financial Constraints	45.1	1 <sup>st</sup>
Inadequate Agro-inputs	21.9	2 <sup>nd</sup>
Problem of Pests and Diseases	14.6	4 <sup>th</sup>
Inadequate Precipitation	8.8	5 <sup>th</sup>

\*Multiple responses were recorded. Field survey-2019.

**Conceptual Clarification of Some Terms**

The United Nations defines Sustainable Land Management (SLM) as “the use of land resources, including soils, water,

animals and plants, for the production of goods to meet changing human needs, while simultaneously ensuring the long-term productive potential of these resources and the maintenance of their environmental functions (UN, 2003).

Sustainable land management (SLM) refers to practices and technologies that aim to integrate the management of land, water, biodiversity, and other environmental resources to meet human needs while ensuring the long-term sustainability of ecosystem services and livelihoods. The term sustainable land management is used, for example, in regional planning and soil or environmental protection, as well as in property and estate management (Kotze, 2003) [6].

The World Bank defines Sustainable Land Management as a process in a charged environment between environmental protection and the guarantee claim of ecosystem services on the one hand. On the other hand, it is about productivity of agriculture and forestry with respect to demographic growth and increasing pressure in land use (World Bank, 2015)

Water management is the activity of planning, developing, distributing and managing the optimum use of water resources. It is a sub-set of water cycle management. Water is very essential for our survival. The field of water resources management will have to continue to adapt to the current and future issues facing the allocation of water. With the growing uncertainties of global climate change and the long term impacts of management actions, the decision-making will be even more difficult. It is likely that ongoing climate change will lead to situations that have not been encountered. As a result, alternative management strategies are sought for in order to avoid setbacks in the allocation of water resources (Ogunlela and Mukhtar, 2009) [10].

Agricultural productivity is measured as the ratio of agricultural outputs to agricultural inputs [1]. While individual products are usually measured by weight, their varying densities make measuring overall agricultural output difficult. Therefore, output is usually measured as the market value of final output, which excludes intermediate products such as corn feed used in the meat industry. This output value may be compared to many different types of inputs such as labour and land (crop yield).

Agricultural productivity may also be measured by what is termed total factor productivity (TFP). This method of calculating agricultural productivity compares an index of agricultural inputs to an index of outputs. This measure of agricultural productivity was established to remedy the shortcomings of the partial measures of productivity; notably that it is often hard to identify the factors cause them to change. Changes in TFP are usually attributed to technological improvements (Ayansina, 2011) [2].

Some sources of agricultural productivity are: Mechanization, High yield varieties, which were the basis of the Green revolution, Fertilizers: Primary plant nutrients: nitrogen, phosphorus and potassium and secondary nutrients such as sulfur, zinc, copper, manganese, calcium, magnesium and molybdenum on deficient soil, Education in management and entrepreneurial techniques to decrease fixed and variable costs and optimize manpower, Liming of acid soils to raise pH and to provide calcium and magnesium, Irrigation, Herbicides, Genetic engineering, Pesticides, Increased plant density, Animal feed made more digestible by processing, Keeping animals indoors in cold

weather (Ayansina, 2011)<sup>[2]</sup>

### Conclusion and Recommendations

There were low women participation in sustainable land use, water management and agricultural productivity in most agriculturally inclined activities in the study area compared to their men counterpart. However, women were more involved in processing, marketing and record keeping activities while men were mostly involved in activities such as land clearing, bush burning, tillage, operating machines, harvesting and threshing. Men and Women should have equal access to productive resources like land to be able to actively participate in sustainable land use, water management and agricultural activities and other income generating activities. This may lead to employment opportunity and reduce poverty level among women and men. Furthermore, the study revealed mode of land acquisition as the major constraint affecting sustainable land use, water management and agricultural productivity in the study areas. Agricultural policies aimed at encouraging and promoting more men and women participation in sustainable land use, water management and agricultural productivity should be encouraged. Due attention to be given by government to both men and women groups by empowering them in land use activities and agricultural development so as to contribute in agro-input utilization and agro- business activities. Men and Women be given special courtesy in the Anchored Borrowing Programme of the FGN/CBN and by reducing the administrative bottlenecks associated with bank loans. The government should put in place a law to compel private organizations and other institutions to mainstream gender in their operations. Systematic participatory methodologies can effectively support diagnosis of gender roles and thus enable decision makers to achieve greater gender equity.

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