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Women's Participation in Natural Resource Conservations in Giwa Local Government Area of Kaduna State, Nigeria

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Authors' contributions

This work was carried out in collaboration between both authors. Author AIL prepared the questionnaire and collected the data for the research. Authors HOY and AIL wrote the first draft of the manuscript and managed the analyses of the data, research design, literature searches and report writing. Both authors read and approved the final manuscript.

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ABSTRACT

The study was conducted to assess the role of rural women in natural resource conservation in Giwa Local Government Area of Kaduna State. A multistage sampling technique was used to select respondents for this study. The first stage involved the purposive selection of Giwa Local Government Area. Secondly, 5 villages were randomly selected and 20% of the women from each of the villages were randomly selected. Primary data were collected from 120 respondents using structured questionnaire. The study revealed that the usage of indigenous knowledge had influence on women's participation on management and conservation practices. The study also showed that, the major problems encountered by rural women in conservation practices are plant diseases and pollution. It was recommended that, sensitization in rural communities by government so as to fight ecological destruction. Degradation of natural resources gradually diminishes the capacity of women in the study area.

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1. INTRODUCTION

Over the past 50 years, ecosystems have changed more rapidly than in any comparable period of time in human history, largely because of the need to meet rapidly growing demands for food, water, timber, fiber, and fuel (natural resources) for their livelihoods [1,2,3]. Thus, livelihoods of women and men depend on the condition of natural resources [4]. Over many generations, women have learnt how and when to use the natural biodiversity that surrounds them. Women, particularly those living in the rural areas have considerable knowledge and experience of managing and conserving natural resources [3]. Through the use of natural resources, women provide sustenance to their families and communities. As consumers and producers, women play an important role in promoting sustainable development through their concern for the quality and sustainability of life for present and future generations [5].

The 1970s and 1980s represented an era in which protection and conservation of the environment became an integral part of national and international policies [6]. Unsustainable and uneven consumption levels have resulted in an increasingly stressed environment, where natural disasters, desertification, and biodiversity loss endanger humans as well as plant and animal species. The complex cycle of poverty, inappropriate development and environmental degradation, have forced people into activities which include destruction of the environment [7], [8,9]. According to [10] society is ecologically sustainable when it conserves ecological life-support system, conserves biological diversity; ensures that the uses of renewable resources are sustainable and minimizes the depletion of non-renewable resource.

The United Nations conference on environment and development held in Rio de Janeiro in June 1992 highlights the importance of women as playing a vital role in environmental conservation and development since they constitute the majority in the world [5]. The challenge of reversing the degradation of natural resources involves significant changes in practices [11]. This paper is therefore aimed at analyzing the role of rural women in natural resource conservation for sustainable development in Giwa Local Government area of Kaduna State.

1.1 Objectives of the Study are to

i. Describe the socio-economic characteristics of women in the study area;
ii. Describe existing natural resource conservation practices in the study area;
iii. Assess the role of rural women in natural resource conservation practices in the study area;
iv. Assess the perception of rural women towards resource conservation in the study area;
v. Identify the problems women encountered in natural resource conservation in the study area.

2. LITERATURE REVIEW

2.1 The Concept of Natural Resource Conservation and Management

Natural resources depict occurring substances that are considered valuable in their relatively unmodified natural form Natural resources occur naturally within environments that exist relatively undisturbed by mankind, in a natural form. Natural resources are materials and components that can be found within the environment. Every man-made product is composed of natural resources (at its fundamental level). Natural resources may exist as a separate entity such as fresh water, and air, as well as animals and aquatic life, or it may exist in an alternate form which must be processed to obtain resources such as metal ores and soil [12].

There are very few resources that are considered inexhaustible (will not run out in foreseeable future) – these are solar radiation, geothermal energy, and air (though access to clean air may not be). The vast majority of resources are exhaustible, which means they have a finite quantity, and can be depleted if managed improperly. The natural resource base is essential for sustained economic development, a prerequisite for poverty eradication and natural resources are the foundation for wealth generation in many of the poorest countries [13]. As nations strive to improve economic welfare, a large part of the costs of these efforts are being passed on to the environment and future generations. Unsustainable production and consumption patterns of land -based products are exerting unprecedented pressure on land resources across the globe [14].

2.2 Rural Women's Indigenous Knowledge in Natural Resource Conservation

Women living in rural areas have learnt what, how and when to use the natural biodiversity that surrounds them. They have the knowledge and the awareness necessary to exploit natural resources for food, medicine, textiles and energy in a sustainable way [5]. During the 1995 Beijing conference, it was stated that women have particular knowledge of ecosystem conservation. Their special knowledge of the environment is derived from the various activities they are engaged in; this knowledge not only includes practical, technical and environmental information but also embodies "wisdom that accrues with training and experience" [15]. In many countries of the world, it is mainly women who are wild plant gatherers, and managers, home gardeners and plant domesticators, herbalist and healers, as well as seed custodians. In several regions and cultures, women are also principal farmers and informal plant breeders, particularly of indigenous crops [16].

Indigenous women have extensive knowledge on collection times and techniques, of managing growth, and of processing and storing wild food plants. However, because wild food plants are conventionally classified as weeds and consequently considered inferior food by outsiders, the nutritional and cultural importance of the products and women's knowledge thereof is rarely recognized and taken into consideration. According to [17] wild food plants provide an important nutritional supplement (mineral, vitamins, fat and protein) to local diets in combined farming-foraging livelihood systems, and act as a buffer in times of need.

It was noted that for centuries, in India, women's knowledge of nature and water resources have provided the basis for making water safe for drinking [18]. Today large numbers of drugs that benefit the entire world have been discovered by following leads from indigenous knowledge systems. Drug discovery is based significantly on indigenous women's knowledge of the uses of plants and the medicinal properties [5]. In Mali, rural women use indigenous knowledge to produce *Jatropha curcas* oil as raw material and fuel. Traditionally, the seeds were harvested by women and used for medical treatment and local soap production. Rural women use *Jatropha curcas* for medicine i.e. seeds as laxative, latex to stop bleeding and against infections, leaves against malaria [19]. Rural women in most African villages have acquired an intimate, practical knowledge of suitability of different tree species for cooking, they know which trees burn slowly and which burn faster, which smoke and kindle easily; thus conserving wood [20].

Studies on women and environment have shown that women are significant actors in natural resource and contributors to environment rehabilitation and conservation. Women's direct contact with the environment has produced their deep knowledge about the environment; they are also protective and caring. Women have held much of this indigenous knowledge which is customarily passed through generations of women from grandmother to granddaughter, aunt to niece, mother to daughter [15]. Similarly, the use of locally produced clay pots in Kenya for storage of drinking water in the home is learnt by young girls who develop an early interest in making pots; they watched their mothers mould pots, and they gradually learn to mould pots themselves [21]. Within indigenous communities, women often represent the most disadvantaged category due to their lack of or limited access to assets such as land, literacy and credit or participation in decision-making processes. These enduring and sometimes widening in equalities, affect the ability of women to carry out their critical roles [22].

3. METHODOLOGY

3.1 Study Area

The study was carried out in Giwa Local Government Area of Kaduna state (LGA), Nigeria. This LGA lies between latitudes 11.20° and 11.50°N and longitudes 7.0° and 7.5°E. It is located northwest of Zaria in the Northern Guinea Savannah and about 640 m above sea level. The local government is bounded in the north by Funtua and Malumfashi local government areas of Katsina state and on the west and south by Birnin Gwari and Igabi local government areas of Kaduna state respectively [23].

Dry and wet seasons are two distinct seasons in the study area: the wet season which begins between April/May usually for 6 months and the dry season starts in November and ends around

late March. Mean annual rainfall varies between 1100 and 1520 mm and mean maximum ambient temperature varies from 27-35℃, depending on the season. The average relative humidity during the wet season is about 72%, and during harmattan period is about 21%. Giwa LGA has an estimated population of about 286,427 [23]. Majority of the population engage in traditional system of farming. Agricultural production is undertaken by small scale farmers, use of heavy machinery and other sophisticated implements is minimal. Mixed cropping is more common amongst farmers.

3.2 Sampling Technique and Data Collection

A multistage sampling technique was used to select respondents for this study. The first stage involved the purposive selection of Giwa local government area. Secondly, 5 villages (Giwa, Shika, Yakawada, Gangara and Galadimawa) were randomly selected. Furthermore, random sampling was also employed in selecting respondents from each of these villages. In all, 120 women were randomly selected for this study. Primary data were collected by the use of structured questionnaires (interviewer-administered). Data were collected based on the socio-economic characteristics, natural resources in the area, their experiences with resource conservation and constraints encountered. Descriptive statistical tools were used to analyze the data, these includes the use of tables, frequency distribution, percentages. Likert type scale was also used to assess the perception of rural women towards resource conservation in the study area.

4. RESULTS AND DISCUSSION

4.1 Socio-economic Characteristics of the Respondents

The results of the study (Table 1) revealed that majority (57%) of the respondents were between the ages of 18-30 years. This implies that, the respondents are in their youthful age, still active and can participate adequately in natural resources conservation activities. Education is an important socio-economic factor that influences farmers' decision because of its influence on farmers' awareness, perception and adoption of innovations that can bring about increase in production or reduction. The result showed that about 42% of the respondents do not have any formal education and 27% had secondary education. This indicates that the respondents have low educational level.

Table 1. Distribution of the respondents base on socioeconomic characteristics

Variables	Frequency	Percentage (%)
Age (years)		
18-30	68	56.7
31-40	26	21.7
41-50	22	18.3
51-60	4	3.3
Educational level		
Primary education	38	31.7
Secondary education	32	26.6
No formal education	50	41.7
Family size		
4-6	50	41.7
7-10	58	48.3
11-13	10	8.3
14 and above	2	1.7
Major occupation		
Trading	54	45.0
Hair dressing	6	5.0
Farming	60	50.0

Forty two percent (42%) of the respondents' household size was between 4-6 persons. This shows that a reasonable number of the respondents have a large household size. High household size provides enough persons for family labour and less money will be needed to pay for hired labour [24]. With more number of people in a family, there is tendency for increase in the level of family labour supply to accomplish various farm operations. However, the absolute number of people in a certain family cannot be used to justify the potential for productive farm work. This is because it can be affected by factors namely; age, sex and health status.

Findings from the study area showed that 45% of the respondents are traders while 50% of the respondents are farmers. This implies that majority of the rural women are farmers. Similarly, [25] stated that women are rural sustainers based on their activities; women carry out most of the work, cultivating the soil, tending livestock, preparing food, fetching water, collecting firewood and wild plants, dealing with waste and managing the household.

4.2 Natural Resources Utilized and Conservation Practices

Table 2 shows the existing natural resources utilized by the respondents in the study area. Eighty three (83%) percent of the respondents identified soil, firewood, water and plant extracts. This implies that over 80% of women utilize these resources in the study area, which involves resource conservation and management. These activities are major among others like fuel-wood collection, fetching of water for domestic use, cooking, treatment of common rural ailments using plant extracts and soil conservation practices such as usage of local manure to replenish the soil fertility. This result is in consonance with [26] states that women are typically involved in the selection, improvement, and adaptation of local plant varieties, as well as seed exchange, management. They often keep home gardens where they grow traditional varieties of vegetables, herbs, and spices selected for their nutritious, medicinal, and culinary advantages. Women, therefore, play an important role in maintaining biodiversity, working against the decrease in biodiversity caused in part by men favoring cash-oriented monocultures.

4.3 The Role of Rural Women in Natural Resources Conservation Practices

In conserving natural resources, about 1.7% of the respondents employ the method of afforestation (tree planting) in conservation; 10% of the respondents employ the method of land fallowing in conservation of natural resources; 3.3% of the respondents employ the method of using tree barks as herbs for medicinal purposes; 3.3% of the respondents employ erosion control method in conservation of natural resources while 81.7% of the respondents employ all the above mentioned methods (afforestation, land fallowing, and erosion control) in conservation of natural resources. This implies that rural women are actively involved in conserving natural resources in their localities in which a variety of methods are used by these women to conserve land resources and diversity of species. This is in line with [27], who state that One of the ways of protecting the environment and reducing hazard such as wind storms and erosion is by planting trees, mulching, multiple cropping, crop rotation, use of natural fertilizers are mostly methods employed by rural women in conserving and managing natural resources. Similarly, [5] observed women in some part of Africa, for generations have used the bark of *Prunus africana* as a cure for prostrate diseases and were always careful to harvest in a manner that preserves this resource. Likewise, the indigenous women in Chile who spin sheep's wool know the type of plant species used to dye wool fiber and also the manner harvest in a manner that ensures re-growth.

Table 2. The Existing natural resources management and conservation practices

Variables	Frequency	Percentage (%)
Existing natural resources		
Soil	4	03.3
Firewood	4	03.3
Water	6	05.0
Plant extract	6	05.0
All of the above	100	83.3
Conservation of natural resources		
Afforestation	2	01.7
Land fallowing	12	10.0
Tree bark as herbs	4	03.3
Erosion control	4	03.3
All of the above	98	81.7
Total	**120**	**100**

4.4 Perception of Rural Women towards Management and Conservation of Resources

Table 3 shows the perception of rural women towards management and conservation of natural resources. The average score of 2.87 obtained showed that the respondents are not greatly involved in natural resource conservation and management. However, the respondents are involved in resource management to some certain extent as indicated by thirty six percent (36%) of the respondents. The mean score of 3.38 indicates the respondents agreed that natural resources conservation helps women in reducing disease outbreak in the rural family; the respondents also perceived (3.48) natural resources conservation to help women in reducing poverty. The perception of the respondents on natural resources conservation improving the livelihood of the rural women was 3.43. In addition, the respondents (3.55) agreed that natural resources conservation and management motivates women to go into small scale business such as back yard gardens where they grow varieties of vegetables and spices for sale. This result conforms with [26] that women

Table 3. Perception of rural women towards management and conservation of resources

Statement	SA	A	U	D	SD	W.T	M.S
Women are greatly involved in natural resources conservation and management	30	176	90	16	32	344	2.87
Natural resources conservation help women reduce disease outbreak in the rural family	110	152	114	16	14	406	3.38
Natural resources conservation and management help rural women in reducing poverty	80	224	84	20	10	418	3.48
Natural resources conservation improves the livelihood of rural women	80	224	78	16	14	412	3.43
Natural resources conservation and management motivates women to go into small scale business	120	192	90	12	12	426	3.55

Note SA= strongly Agreed; A=Agreed; U=Undecided, D=Disagreed; SD= Strongly disagreed; W.T=Weighted total; M.S=Mean score*

play important roles in maintaining biodiversity and working against the decrease in biodiversity caused in part by men favoring cash-oriented monocultures.

Table 4. Problems associated with women in natural resources management and conservation practices

Constraining variables	Frequency*	Percentage (%)*
Pollution	4	03.3
Depletion of soil nutrients	42	35.0
Plant diseases	66	55.0
Plant extinction	14	11.7
Traditional belief	7	5.8

**Multiple responses*

This implies that a good management and conservation of natural resources improves the standard of living of the rural women such as reduction in disease outbreak, poverty reduction, encourages small business. This finding is in line with [25] that rural women have conserved and managed the resources available to them for centuries. Women recognized this through experience that only with careful management of resources would their survival and of their family are ensured. Women tended and utilized their environment in a way that is now termed "sustainable" without the knowledge from text books, rural women have become experts in natural resource management.

4.5 Problems Encountered by Women in Natural Resources Management and Conservation Practices

Women in the rural areas encounter problems in conservation practices. Three percent (3%) of the respondents stated that pollution was the problem that they encountered while managing natural resources; 35% stated that depletion of soil nutrients was the problem that they encountered; 55% reported plant diseases was a problem to them; 11.7% indicated plant extinction while 5.8% said traditional belief was the problem associated with women in natural resources management and conservation practices. This means that, the most common or major problem encountered by rural women in managing natural resources as well as in conservation practice is that of plant diseases.

5. CONCLUSIONS AND RECOMMENDA-TIONS

Conservation and wise use of natural resources is mostly the domain of women. However, degradation of natural resources gradually diminishes the capacity of women in sourcing and conserving of natural resources. Their traditional activities, skills and modern knowledge are crucial in understanding why land deteriorate or remain viable, why it is becoming increasingly important to protect soil from erosion and degradation. It can therefore be stated that women would accept natural resource management and conservation practices from

Extension Agents, Crop protection experts and Plant scientist to take care of the predominant problems faced. Therefore the following recommendations are made:

i. The findings show that majority of the studied rural women use indigenous knowledge in understanding the concept of natural resource conservation. It is re commended that research institutions should bring about modern methods of resource conservation for sustainable development so as to boost sustainability, reduce ecological destruction and depletion, improve their livelihood and also make a significant contribution to the development of local communities.

ii. It is evident that the rural women had little or no access to formal education. It is recommended that government and other intervening agencies on agriculture should introduce adult education/extension to educate rural women on new and improved natural resources conservation and management practices.

iii. The study had identified some constraints such as water pollution, soil depletion, plant extinction, diseases that may affect the activities of rural women. It is recommended that government and other intervening agencies on agriculture should ensure that strong institutional linkages and awareness are created among farmers for mitigating the negative effects of these human activities on natural resources to their livelihood.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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