

The Role of Women in Farm, Household and Environmental Waste Management

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Abstract: The agricultural practices engaged in by farmers have effect on the products, consumers and the environment. One of the targets of the Millennium Development Goals is to ensure environmental sustainability. Human survival demands that environmental consideration should be paramount in pursuit of development. Farm households and rural communities in their daily activities are major generators of wastes, in the form of manure, crop residues or mixed solid wastes. Organic farming technology is generally regarded as the solution to environmental problems that are related to agriculture and food safety. According to the Federal Ministry of Agriculture and Rural Development, women account for 75 percent of the farming population in Nigeria. Waste management is an important issue in any society and is still a challenge for local authorities in many parts of the world. Insufficient and inefficient management of wastes have direct impact on the environment, human health and livelihoods. This also affects social and economic development. Considering the large number of women involved in agriculture, assessing their role in farm and household waste management is essential. This paper therefore focused on Traditional waste management and new policies on waste management, traditional waste management strategies in Nigeria, challenges of traditional waste management, the 7Rs of waste management, the role of women in , farm , household and environmental waste management, the place of organic agriculture in waste management and gender inequality in waste management. The paper recommended among others that gender issues are mainstreamed in all governance and decision making process related to waste management and there should be a synergy of government, waste managers, public health workers and households to implement a sustainable and reliable waste management practices in Nigeria. The various roles of women and recommendations presented in this paper can be of reference for scholars and stakeholders towards enhancing gender and sustainable development goals in Africa.

Keywords: women, waste management, Farm, household and Organic farming

I. INTRODUCTION

Wastes can be defined as the unwanted by-products of human activities. It is any unwanted material that is due for discarding. Abdullahi, (2011) described it technically as a resource in the wrong place A substance regarded as a waste to one individual, may be a resource to another. Therefore, a material can only be regarded as a waste when the owner labels it as such (Dijkema, Reuter, & Verhoef, 2000). It is human activities that generates waste (Brunner and Rechberger, 2014) Vergara & Tchobanoglous (2012) reported that as population and purchasing power of people increases worldwide, more goods are produced to meet

increasing demand, thereby leading to the production of more waste. Continuous flow of waste becomes hazardous to man, animals and the environment. It is on this note that Vergara & Tchobanoglous (2012) stated that proper planning and control is required in order to prevent the negative impact of waste on the environment. As a result, Ghiani, Laganà, Manni, Musmanno, & Vigo. (2014) added that, a proper organization of solid waste management has become an essential task needed to safeguard the environment.

Demirbas (2011) describes waste management as a process by which wastes are gathered, transported and processed before disposal of any remaining residues and the main reason for managing waste is to ensure a safe environment

Waste are usually classified by

- Physical state of waste ; solid, liquid and gaseous;
- Source: Household/Domestic waste, Industrial waste, Agricultural waste, Commercial, Demolition, construction and Mining,
- Environmental impact waste; Hazardous and Non-hazardous

The classes of solid waste based on source are: municipal which consists of everyday items we use and throw away, such as product packaging, grass clippings, furniture, clothing, food scraps, newspapers, appliances and the like. Municipal wastes contribute the highest volume annually (Victor and Choji, 2006). For the purpose of this study, municipal solid waste is considered with emphasis on household / domestic and agricultural waste.

Farm households and rural communities in their daily activities are major generators of wastes, in the form of manure, crop residues or mixed solid wastes. Waste management is an important issue in any society and is still a challenge for local authorities in many parts of the world. Insufficient and inefficient management of wastes have direct impact on the environment, human health and livelihoods. Women account for 75 percent of the farming population in Nigeria (Sahel News Paper vol 7 Sep / Oct 2014) Considering the large number of women involved in agriculture, assessing their role in farm, household and environmental waste management is essential Organic farming technology is generally regarded as the solution to environmental problems that are related to agriculture as well as food safety.

This paper therefore focused on

- Methods of waste management
- Traditional waste management strategies and new policies in Nigeria.
- Challenges of traditional waste management
- The 7'Rs of waste management
- The role of women in farm, household and environmental waste management
- The place of organic agriculture in waste management.
- Gender inequality in waste management

II. METHODS OF WASTE DISPOSAL

- *Open Dump*: This is a refuse disposal method where wastes are dumped indiscriminately in any available space.
- *Animal Feeding*: Domestic animals such as goats, dogs, and sheep are fed with wastes like yam peels, cassava peels, leaves, and leftover foods.
- *River and Ocean Dumping*: Wastes containing numerous chemical substances are discharged into water bodies. This is hazardous to aquatic life, man, animals and the environment. It renders the water toxic to aquatic life as well as humans (Ogwueleka, 2009)
- *Incineration*: This is the process of burning combustible wastes at high temperatures. This method reduces the volume of such wastes by 90 % (Alam & Ahmade 2013). This method only reduces the size of wastes, it is not a total means of waste disposal, and it is also associated with fire disaster and the release of Greenhouse gases (Ji, Lu, Yang, Du, Chen, Buekens, & Yan (2016)
- *Deep-Well Injection*: The deep-well injection method involves the deposition of wastes into the subsurface, impermeable rock layers. The disadvantage associated with this method is that it can lead to groundwater contamination
- *Sanitary Landfills*: This method of waste disposal involves the use of waste as landfills. The process is carried out by spreading wastes in thin layers and compressing with a heavy bulldozer when each layer is added. This process is repeated until the pit is filled.
- *Composting*: Composting can eradicate degradable organic wastes. Degradable organic wastes are otherwise known as biodegradable wastes (Abdel-Shafy & Mansour 2018) [41]. Composting is a workable means of transforming various organic wastes into products that can be safely used and beneficially employed as bio fertilizers.

Traditional Waste Management Strategies and New Policies In Nigeria.

Population growth and economic development is a major contribution to solid waste generation in urban areas (World Bank 2019). In Africa, there is increased urban waste

generation leading to health hazards, underground water and air pollution. Nigeria generates over 32 million tons of solid waste yearly and only a fraction is collected (Mazhindu, Gumbo, & Gondo, 2012) Waste management in Nigeria is under the purview of Ministry of Environment at the Federal and State levels. At the Local Government Level, it is under Environmental Health Department. These offices were established under legislature and guidelines relating to waste management. Examples of this legislature are: The harmful waste act of 1988; National Environmental Standards and Regulations Enforcement Agency (NESREA) act 2007; Environmental Impact Assessment act of 1992; National Environmental (sanitation and waste control) Regulations 2009. Virtually all states in Nigeria have established waste authorities under their Ministry of Environment (National Environmental Standards and Regulations Enforcement Agency 2007). Waste authorities in various parts of Nigeria employ the following process of waste management: Waste generation and characterization, waste collection and transportation and waste disposal and treatment.

- *Waste generation and characterization.*

A fundamental step in effective waste management is waste generation and characterization. Sha'Ato, Aboho, Oketunde, Eneji, Unazi, & Agwa, (2007) reported in a study carried out in Makurdi, North Central Nigeria, that solid waste generated are mainly household's than commercial, institutional, and industrial premises. Bassey et al 2006 in their study at the Federal capital territory Abuja showed that health outfits and hospitals generates sizeable amount of solid waste collected daily and that such waste poses serious harm to the environment. In Rivers state, the most prominent categories of waste identified were organic waste, papers and nylon (Babatunde, Vincent-Akpu, Woke, Atarhinyo, Aharanwa, Green, & Isaac-Joe 2013). According to Sha'Ato, Aboho, Oketunde, Eneji, Unazi, & Agwa, (2007), waste from households consist of various biodegradable materials 36.6% and they suggested composting as the best form of waste management. Nnaji 2015 observed that the rate of plastic, water proof and diapers generation has increased tremendously.

- *Waste collection and transportation*

The collection of urban household solid waste rest on government agencies traditionally. Olukanmi & Mnenga 2015 suggested household patronage of informal private solid waste collection as against government provided for effective waste management. In Nigeria most households pay private waste managers to dispose the waste generated. The fair as at today ranges from #1,000 to # 2,000 per household in Ughelli, Delta state, Nigeria.

- *Waste disposal and treatment*

The final step in waste management process after waste generation, collection and transportation is the disposal. In most cases, dump sites especially in Nigeria are provided but

not adequately managed. Illegal dumping of waste is prevalent and this creates loss of aesthetics in the environment, constitute great hazards to man and the environment. According to Nnaji(2015), more than 50 percent of residents in Makurdi in Northern Nigeria and Ughelli in Southern Nigeria dispose of their waste in open dumps.

Challenges of Traditional Waste Management

Solid waste management in Nigeria is poor (Amasuomo & Baird 2016). The challenges facing waste management as highlighted in various studies, include: inadequate environmental policies and legislation, loopholes in policies and nonexistence of policies in some states, poor funding, low level of government support, inadequate facilities, corruption, inappropriate technology, heavy reliance on government policies and authorities for implementation, limited public and environmental awareness. (Amasuomo & Baird 2016; Oyeniyi 2011; Amuda,., Adebisi, ., Jimoda,., &Alade, 2014; Olukanni,., Adeleke,., &Aremu, 2016; Ogwueleka 2009)

The 7Rs of Waste Management

Human survival demands that safety of man and its environment should be paramount in pursuit of development at any level or sector. Any act that threatens the integrity of the environment must be discouraged. Waste management strategies must consider the issue of safety of both man and its environment. What we purchase and how we dispose waste can harm the environment. In recent years, the 3Rs of Reduce, Reuse and Recycle in waste management has been expanded to become the 7Rs – Rethink, Refuse, Reduce, Repurpose, Reuse, Recycle and Rot. (<https://theglobalhues.com/7-rs-of-waste-management-steps-to-sustainability/>) These 7 concepts focuses on minimizing waste and taking steps towards sustainability that leads to safe environment and living a zero waste life.

Rethink- Given a second thought before purchasing any item. This helps to save resources and enable man to buy what he actually needs to avoid waste.

Refuse- Refuse to buy wasteful and non-recyclable products.

Reduce – Think smartly on using recyclable packaging materials. Refuse harmful, wasteful and non - recyclable products.

Repurposed- Items that cannot be refused, reduced or reused can be repurposed. For example, daily newspapers can be used for arts and crafts or compost

Reuse- Instead of throw away culture of plastic plates, spoons and wrapping sheets. Paper form of these items that are recyclable can be used.

Recycle:Recycling is the process of collecting and processing materials that would otherwise be thrown away as trash and turning them into new products. Recycling can benefit theenvironment. Examples of things that

can be recycled arePlastic Bags, Milk Cartons, Plastic Water Bottles,.Empty Ice Cream Container, Empty Roll-On Deodorant Bottles, JeansYou No Longer Wear, Old Clothing. Farm and kitchen waste.(<https://www.google.com/search?q=recycle&client=firefox-b-d&sxsrf=ALeKk02v-Kv>)

Rot-Sha' Ato (2007) recommended composting as the best waste management practice. Decomposable materials such as left over foods, papers, weeds, and farm waste usually rot and can be used in composting. This is a good source of manure that can improve the soil quality for better crop yields.

Organic Farming: Waste Management Opportunities for Rural Communities

As defined by Shaban and Omaina (2010), farm wastes are residues produced as a result of various agricultural operations. Household farms in rural communities generate solid organic wastes such as manure, tree trimmings, grass clippings, and crop residues such as rice husk, rice straws, maize stalk, maize husk, maize cobs, cassava peels and stalk, groundnut shells and straws, soy beans pods, sugarcane bagasse and leaves, and cotton stalk. About 80 percent of the total solid wastes generated in any farm household are organic wastes (Obi, Ugwuishiwu&Nwakaire 2016). Also, livestock generate large amounts of wastes. Manure production can amount up to 5.27 kg/day/1000 kg live weight, on a wet weight basis (Mbam and Nwibo 2013)Improper waste management is detrimental to human health. Apart from being unsightly, it causes air pollution, affects water bodies when dumped into the water, as well as depletes the ozone layer when burnt, thereby increasing the impact of climate change (Aruna, Subashini, & Indira, 2018, Alam, &Ahmade 2013) Composting is an aerobic process where complex degradable materials are degraded and transformed by microorganisms into organic and inorganic byproducts (Toledo, Siles, Gutiérrez, & Martín 2018). It is a safe method of waste management.

Composting is a microbiological, non-polluting and safe method for disposaland recycling of organic wastes by bioconversion to fertilizers. Some agricultural wastes such as cow dungs, poultry droppings, etc. are biodegradable wastes (Bhat, Dar, Dar, & Dar 2018). While tough textured components. Wastes such as wood and cardboards are slowly degrading wastes. Non-Biodegradable wastes, on the other hand, cannot be broken down biologically. Examples of non-biodegradable wastes are wastes from mines, mineral materials, polythene bags, leathers, plastics and others.

With the growing prominence of environmental concerns and a crisis in waste disposal, composting offers a benign way to divert a significant portion of the solid waste stream out of costly landfill and incinerators without considering the huge collection and transport costs. It is for this reason that an increasing number of rural communities are promoting composting as the most sensible and economic way to manage

large volumes of organic waste. Farmers and rural communities have several strategies for managing the large amount of organic wastes generated. The recycling of organic wastes for maintenance of soil quality and improved crop productivity is of economic importance. Composting helps to ensure environmental sustainability, as it helps to hold the soil particles together, thereby preventing erosion. It helps to keep wastes in a controlled environment and recycled to a useful product. They help in the bioremediation of polluted soil. They also increase biodiversity in the soil by attracting different insects, bacteria, fungi, etc. that are beneficial to the crop. They are treated in a controlled environment where they do not stay forever they also help to suppress diseases in plants and enrich the soil. Composting help to reduce greenhouse effects by mitigating the production of gases like methane. Though CO₂ is release during composting, lesser compared to other (combustion) modes of waste management. It reduces the volume of wastes drastically. Composting is the most sensible and economic way to manage large volumes of organic waste.

Role of Women In Waste Management.

Every household in every city is a primary source of waste generation, thus the waste management techniques of every householder directly affect the sustainability of the environment. Household dwellings are the producers of domestic solid waste, which contains kitchen wastes, paper and cartons, plastic, rubber, leather, bone, glass, ashes and metals.

The industrial goods used as packaging nowadays account for much of the increase in waste in the household. In the issue of waste elimination from kitchen, house and the environment, women are the group of people who need to be considered. Women have a role, which is different from that of men. As mothers and home - makers as well as educators, entrepreneurs and producers, women, play multiple roles. Definitely, women have the major role in sustaining the environment through proper practices in household waste management.

Proper environmental household waste management requires attitudinal awareness from both men and women and an understanding of and sensitivity of the sustainable environment and the needs and concerns of each householder.

A household is defined a group of people, often a family, who live together (Cambridge English Dictionary) It is a family where people live together cooking in one kitchen and sharing food together from one pot. Household members can influence the character of household allocation, and household labour force practices play an important role in allocating household labour participation activities. Women play the predominant roles in the household work labour force anywhere in the world. Maintaining the household, , gathering food, cooking, processing and gardening, As housewives, women are still primarily responsible for the purchase of consumer products, such as food items, cleaning materials,

childcare and other essentials for the household. Often women who care for the sick contribute more to the household in maintaining the health of their families by the provision of clean water, food, energy sources, shelter, sanitation, and waste disposal.

Women's role in waste management can be outlined as follows:

- Child-rearing to a large extent, means women have an important influence on the development of the child's perception of the environment, making women the first environmental educators. Environmental education concerns knowledge of plants and animal species and their direct environment, as well as practical skills in environmental use and management. Studies have shown that women are generally responsible for human waste disposal of children and cleanliness of latrines and other facilities (Akwa, 2009).
- Waste pickers and scavengers of dump sites and organizers of recycling materials. (Recycling of materials to produce new product). The role of women in reducing wastes, and in providing resources for manufacturing, cannot be dismissed as unimportant and we cannot afford to ignore the status and needs of waste pickers (Nguyen et al., 2003 it is reported that up to 2% of the population in Asian and Latin American cities depend on waste picking to earn their livelihood (Medina, 2000).). The World Bank has estimated that up to 2 percent of the population in Third World countries survive by recovering materials from waste and substantial numbers of these are women. Scavengers salvage materials to sell for recycling, as well as repairable and reusable items that can sell or use themselves. In solidwaste management, especially in developing countries, women play a decisive role.
- Waste collection and disposal of waste from household and business
- Human and animal waste handling, street sweeping and little maintenance of public spaces,
- Associated with cleanliness of home and for the health of the family which transcend to community maintenance that relate to responsibility for waste management
- Important managers of biomes which flow in agricultural systems like forestry animal husbandry, harvesting and processing
- Women are responsible for removing the garbage from the home (kitchen) and putting into public space. They have daily and direct relationship to garbage
- Women in general are responsible for cleanliness and hygiene within the home, and that this responsibility extends to the areas around the home, compound and neighborhood.

- Composting. This in most cases are entirely carried out by women, though some women receive occasional help from husbands or sons (Gender and Waste Conference, 2000).

Gender Equality in Waste Management.

Gender equality requires the recognition of the Role of Women in Farm, Household and Environmental Waste Management. This involves:

- Creating and strengthening women's leadership and supporting their membership in waste management institutions.
- Supporting women's roles as waste managers, ensuring that women are empowered for better delivery
- Alleviate women's work burden associated with waste collection work through provision of labour-saving technologies.
- Employment opportunities in waste disposal or sewage treatment. In some urban centers, solid waste management has evolved into an organized system of collection, trade and recycling, waste disposal initiatives could offer improved employment possibilities for women.
- Participation in community decision making about waste disposal. Despitewomen's relatively high involvement in waste management, men are more likely to have access to institutions that set priorities and make decisions regarding municipal infrastructure. Community consultations processes often fail to take gender inequalities into consideration and thus neglect women's preferences. Explicit measures should be taken to ensure women's participation and their priorities, responsibilities and needs taken into consideration.
- Addressing the multifaceted gender discriminations in accessing and controlling waste management machines such as tractors, bulldozer and the like
- Women undergoing extensive training in Solid Waste Management and entrepreneurial options, including the linkage between deteriorating environment, waste, and human health, the treatment and management of waste and recycling.
- Enhancing the capacities of relevant stakeholders from government, civil society, and the development partners to understand and address gender issues in waste management and governance.
- Provision of protective gadgets for women especially street sweepers

III. SUMMARY AND CONCLUSION

Large number of women is involved in agriculture and also play major role in waste management. They are the first environmental educators, responsible for human waste for disposal of children cleanliness of latrines, waste pickers and scavengers, street sweepers, managers of biomass which flows in agricultural system, hygiene within home and public places and composting. Composting is an organic farming practice. The system is considered the safest of all waste management practices.

Understanding the role of women in waste management will help policy makers on waste management to know what opportunities women have in small scale waste management, how gender affects the effectiveness of waste management and environmental sustainability, what strategies and methods can be applied to enhance women's contribution.

IV. RECOMMENDATIONS

- Women play major role in waste management and it is therefore crucial to ensure that gender issues are mainstreamed in all governance and decision making process related to waste management.
- There should be a synergy of government, waste managers, public health workers and households to implement a sustainable and reliable waste management practices in Nigeria.
- To reduce the quantity of household waste to be disposed, families are encouraged to characterize the waste before disposal. Biodegradable items can be separated and used for composting.
- Creation of awareness public and environmental of relevance of effective waste management and the need for all stakeholders to embrace the 7R's concepts that focuses on minimizing waste and taking steps towards sustainability that leads to safe environment and living a zero waste life.
- Effective implementation of policies on waste management at the federal, state and local government level.

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