



Impact of Sustainable (FADAMA) Lowland Crop Farming

Usman M. I^{1.}, Washara Esther Yaula², Yahaya Yusuf Shalanggwa² and
Abdullahi Abba Mamman²

¹Department of Agricultural and Bio-Environmental Engineering Federal polytechnic
Monguno, Borno State.

²Department of Agricultural and Bio-Environmental Engineering. Ramat polytechnic
Maiduguri, Borno State.

Corresponding Email: tkbusman@gmail.com

Abstract: *Most of the vast potential of (Fadama) lowlands including crop production. Though, lowlands also incorporate numerous ecosystem utilities that inhibit them from exploitative practices. Hence, (Fadama) lowland operation for crop production have a duty to consider measures to attain sustainable development goals (SDGs) in one hand. On the other hand, SDGs ought to ensure the sustainable practice of (Fadama) lowlands. This work proposes to assess the sustainability of crop production in lowland as it supports the achievement of SDGs, which tends to eradicate hunger, achieving food security with good nutrition, and improving sustainable agriculture. These goals essential to be achieved in 2030 by endorsing sustainable crop production systems, applying through agricultural practices, production accumulation and productivity, and at the same time maintaining environmental and (Fadama) lowland ecosystems. So, this work will review three major aspects as follows: Method to produce crop in climatic condition, Ideal Crops for (Fadama) Lowland, and impact of Climate on crop Quality. This paper is projected to yield sustainable processes of crop production in (Fadama) lowlands to contribute to the accomplishment of sustainable development goals (SDGs).*

Key words: *Crop farming, sustainable development Goals, Fadama lowlands*

Introduction

Rice belongs to the genus *Oryza* in the family Poaceae. It is a small genus of 20 to 25 species with a pantropical and subtropical distribution. Two species of the genus are cultivated: *O. sativa* L., the universally cultivated Asian rice, and *O. glaberrima* Steud., of the West African rice. [1]. It is one of the most important cereal crops in Nigeria. Rice consumption is increasing rapidly in Nigeria because of urbanization, relative ease of preparation, and convenience in storage. It is commonly boiled and eaten with stew or vegetable soup. It is also used in the preparation of several local dishes that are eaten in every home, especially during festivals and ceremonies [2]. Conversely, rice supply falls short of the demand; the country depends heavily on rice importation of over 5 million tons annually, equivalent to over \$US 800 million in foreign exchange. Recently, the Federal Government of Nigeria stop

the rice importation and it boarder to "protect local producers against massive imports of rice". This strategy is motivating attention in the domestic production of rice.

However, as detailed in the Nigeria Productivity Blueprint⁴ of sustainable development goal (SDG), the productivity of farmers in the agro-food sector is plagued by issues such as: a) Insufficient focus on value-adding activities and disconnections along the value chain; b) Multiple small producers with low levels of productivity; c) Issues with quality and standards across the subsector; and d) Low adoption of technology and modern farming practices [3] in [4].

Therefore, the approaches "sustainability" term remains diverse, particularly in agriculture. The challenges of diversity issues reflect faced by unique communities can be seen in different dimensions like politics, social and environmental, economic, knowledge and technology, just to mention a few that go along with (Fadama) lowlands that are located Jere Rice Bowl of Borno state which include several sub-districts such as Koshebe, Gongolon and Ayaba lowlands as agricultural resource which is anticipated to tolerate crop production requirements to be sustained in order to fulfil food needs for the next generation. (Fadama) lowlands can be retained through proper utilization of agricultural inputs, sufficient maintenance of infrastructures, and effective control on farmland from conversion Usman et al. 2019 in (Hoang and Alauddin 2012). Although, there is a deficiency of applicable measures in deciding crop production sustainability. With several signs of sustainability that are found in the SDGs, and cannot be used to quantify the sustainability of crop production since the indicators are inadequate in terms of calculations and not in agreement with some exact site for the production crop. Hence the study to checkmate and assess the (Fadama) lowland is necessary and "what is the way out for researcher to implore for a sustainable yield of crop production in (Fadama) lowlands"?

Whilst domestic production has been increasing judiciously, consumption has been increasing at a more rapidly step. Stating that consumption outshines production in Nigeria, as imported rice plays a vigorous role in closing the gap Usman et al. 2019. However, the dependence on imports at the back of limited domestic resources and production capacity naturally lead to concerns related to food security and the nation's ability to be self-sufficient in its rice production. Unsurprisingly, policies have thus always tended to focus on increasing total production of paddy in bulk for cheap local rice with less focus on premium, specialty rice products. However, the latter seems to hold some potential towards reviving the lowland, which could help to improve the farmers' income and SDGs.

Hence, increase in rice could yield more due to farmers using enhanced rice varieties which have potential to increase nutrition, improve food security, nurture rural development and support sustainable development goals (SDG). Therefore, it was found imperative to study the adoption of rice production technologies in Jere Local Government Area of Borno State, Nigeria. With the view of given specific attention in this report of SDGs through review of relevant papers. The objective of this paper is to prioritize a constant growth in food production, especially for rice (the staple food of the dwellers) and challenges of sustainable crop production in (Fadama) lowlands, based on sustainable development goals achievements.

Methodology

The study was steered in Jere Local Government Area of Borno State, in north-eastern Nigeria. Lying within the latitudes of 11°40' and 12°05'N with longitudes of 13°50' and 12°20'E, it conquers a total landmass of 160 square kilometer [5]. It shares boundaries within the state, with Maiduguri Metropolitan Council to the north, Konduga Local Government Area to the south and Mafa Local Government Area to the east. The climate of the area is described by dry and hot seasons, with a minimum temperature ranging from 15-20°C, while the maximum temperature ranges from 37-45°C. The annual rainfall ranges from 500mm to 700mm per annum [6]. The rainy season is usually from May to October with low relative humidity and short wet seasons. Generally, the topography is low land plain, and the soil is generally sandy with short grasses and thorny shrubs. Jere Local Government Area has a projected population of 211,204 persons with annual growth rate of 2.8% [7]. Majority of the dwellers are farmers, traders and civil servants. The major ethnic groups are Kanuri and Shuwa-Arab. Others includes Hausa, Bura and Fulani and many immigrant settlers from within and outside Nigeria [8].

The Jere Rice Bowl of Borno state, Nigeria provides a further example of how rice cultivation is still thriving contrary to all odds. This is one of the most famous rice zones in Nigeria. In 1990, the Jere Farmers Development Association - Zabarmari had cause to complain to the state Governor on the release of water thus: The Rice Bowl encompasses some village units comprising over 150,000 hectares with a cultivated area of 37,900 ha which depend on the water from Alau Dam [9].

This paper was carved out through assessment of relevant literature in crop production and soil science development in lowlands from both theoretical and methodological perspectives. theoretical and methodological perspectives of this paper was written through assessment of relevant literature both in crop production and soil science discipline for lowland crop farming development. Most of the literature reviewed include papers journals, articles and sustainable development goals (SDGs) documents, and reports.

Results and Discussion

Flooding is simply an overflow of water, but there are many different types of flood depending on where that water comes from and why it is overflowing. In addition to land typology, the type of overflow has a very important meaning in determining the suitability of the area for farming. Based on its hydro- topography (fadama) lowland can be classified into five categories, namely: 1. Type A Tidal/Coastal Flooding: Tidal flooding is any flooding that results from the sea, whether that's tidal rivers overflowing, or large waves crashing the sea front. This type of flooding is usually very sudden, as the tides can change quickly and with no warning. This means that the resulting floods are extremely dangerous, especially in the case of a coastline that is frequented by pedestrians or vehicles. 2. Type B Flash Flooding: Flash flooding is usually the result of exceptionally heavy rain that overwhelms drainage systems or breeches flood defences. These floods are very fast moving and unexpected, which means that they can be very dangerous. This type of flooding is likely to rise as climate change continues. The risk is also increased by more developments being constructed on flood plains and natural drainage systems being concreted over for construction. 3. Type C. Fluvial/River Flooding: Fluvial flooding is any type of flood that results from rivers or waterways. They are usually the result of heavy

rain that exceeds river capacity and causes them to burst their banks. This type of flooding can usually be anticipated, as it results from prolonged rain and often happens regularly in the same areas. Residents can usually see the water level rising over a few days or weeks, signalling that a flood may be imminent. Other causes include obstructions in the river, such as a build-up of rubbish or a fallen tree, or runoff caused by melting snow. 4. Type D. Groundwater Flooding: Groundwater flooding occurs when the natural water level below ground rises to well above what can be accommodated. This can happen after prolonged or extremely heavy rainfall, and will result in the ground becoming so waterlogged that it can no longer drain water away naturally. The effects of groundwater flooding are often worsened by construction. Large, open areas are concreted over, removing soil and vegetation that would have contributed to absorbing the rainwater. 5. Type E. Sewer Flooding: Sewer flooding is the overflow of water from the drainage and sewerage system. It can be the result of damage in the sewers, or the capacity of the system may be overwhelmed by heavy rain, flash flooding or groundwater flooding. Sewer flooding is extremely hazardous, as the water is full of bacteria and contaminants. Wastewater and sewage can overflow into residential areas, posing a real risk to human health and safety [10]. Types D is often referred to as direct lowlands. Lowlands have the prospect to be developed into agricultural land to support crop production. Therefore, its sustainable use must be conserved for future generations.

Consequently, many Nigerians toil under the burden of poverty and unemployment as well as rampant inequality in income and access to basic services. An estimated 62.6% of the population live below the [old] international poverty line (PPP 1.25 \$ per day) while some 27.9 % are multi-dimensionally poor. Unemployment has been on the rise over the past two years, with the rate more than doubling from Q4 2014 figure of 6.4% to the current (Q1 2017) figure of 14.2%. Income inequality, measured by the Gini Coefficient, stands at 43%, implying that inclusive growth remains elusive. Inequality is evident not just with respect to income, but also in terms of access to basic social services and opportunities. When Nigeria's Human Development Index (HDI value = 0.527) is discounted for inequality, it falls to 0.328 which is a loss of 37.8%. In terms of the SDGs Index which ranks countries based on their performance across the 17 goals, the country is ranked a lowly 141 out of 149 countries with a score of 36.1% against the regional average of 42.5%. In a nutshell, the country faces many challenges in her efforts to meet the SDGs, including but not limited to poverty, insecurity, social inequality, the absence of inclusive growth, youth unemployment, gender inequality, limited funding as well as prevalent weak institutional capacities.

Conclusion

The attainment of sustainable crop cultivation in tidal lowlands based to Goals #2 and #13, the program of sustainable crop creation in tidal lowland should consist of: Investigation on procedures of productive means of crop cultivation in tidal lowlands to produce with the indicators of SDGs that contribute to the realization of goal #2 of The SDGs to ensure sustainable agriculture practices. Pursuing an actual influence of climate on crop quality with agricultural waste and pollution in crop production in (Fadama) lowlands to achieve goal #13 of The SDGs to safeguard liable production system and reduce chemical use in crop production. Estimate the efficient use of agricultural inputs in crop production in (Fadama) lowlands to achieve goal #13 of the SDGs to ensure sustainable management and resource operation and competence.

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Significance statement

This study discovered the (Fadama) lowlands that can be beneficial for sustainable development goal (SDG). this study will help the researchers to uncover the critical areas of Crop farming that many researchers were not able to explore. Thus, a new theory on sustainability of crop production may be arrived at.

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