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Aims and Scope

The of the journal is to advanced understanding of the concept of environment planning in relation to sustainable development and also to serve as a bridge between academic and practitioner community and guide police and management practice to achieve environment sustainability. Environmental planning is the process of facilitating decision making to carry out land development with the consideration given to the natural environment, social, political, economic and governance factors and provides a holistic framework to achieve sustainable outcome. Sustainability is the capacity to endure social-ecological process characterize by the pursuit of a common ideal economic development, social development and environmental protection. Environmental sustainability is the rate of renewable resource harvest, pollution creation, and non-renewable resource depletion that can be continued indefinitely. If they cannot be continued indefinitely than they are not sustainable. The scope of the journal includes, but are not limited to, the following field namely: environmental policy and legislation sustainable development, environmental planning, urban planning, relational planning, town planning, rural planning, conversational management, disaster management natural resource planning and management, environmental and strategic impact assessment, environmental management, environmental economic, valuation and natural resource accounting, regulatory and market-based instrument for environmental management, sustainable agriculture, waste management, global climate change studies and application of remote sensing GIS,

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Journal of environmental planning and suitability is published by urban and regional planning unity of the department of geography of the nasarawa state university, keffi (NSUK) the journal provides an academic platform for professional and researchers to contribute innovative work in the field all articles must relate to concept of environmental planning and sustainability and must encompass applied research the application of new approach and techniques and the evaluation of policy and practice, the editor also welcome critical state-of-the-act, reviews paper, contribution from integrated and cross-disciplinary research team and from policy makers and practitioners are welcome. This maiden edition vol: I No: I, 2017 will consist at list 300 pages featuring indebt peer reviewed papers shorter “articles from the” field “, “crossfire-a debt on topical issues argued out between expert/specialist; book reviews-

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TABLE OF CONTENTS

\

TABLE OF CONTENTS

Aims and Scope ii

About the Journal ii

Assessing The Existence Of The Atmospheric Urban Heat Island Over Kano Metropolis, Nigeria
Suleiman Yahaya Mohammedand Isah Abdullahi Tanko 02

Vulnerability of Subsistence Farmers to Climate Change in Niger State, North Central Nigeria
Sule Isaiah 16

Perceived Causes Of Erosion and Its Effect on Building Structures In Nasarawa State University Keffi Campus
M.A. Yamusa, A.A. Kadafa, N.M. Idris, A.H. Abba and M. Aminu 30

Subsistence Farmers' Adaptation Strategies to Climate Change in Niger State, Nigeria
Sule I., Okhimamhe A.A., Suleiman Y.M., Adenle A.A., Odekunle M. 40

Assessment of Groundwater Potential within Nasarawa State University Keffi, Nasarawa State.
Alkali Mohammed and Usman Ahmed Shehu 56

Effect Of Samaru - Dange Road Maintenance On Adjacent Environment In North-Western Part Of Nigeria
Muhammad Oyale Akhadelor, Ibrahim Musa Jaro, Binta Abdulkarim, Hamza Mohammed, Salamatu Abraham Epko and Shamsundeen Muhammad Giwa. 68

The Impacts Of Climate And Land Use/Cover Change On Nigerian Section Of Lake Chad Using Satellite Remote Sensing
JJ Kunda, Chunwate BT Chindo MM Onah I, Oladeinde SO 82

Spatio-Temporal Variability of Discharge in Osun River Basin, Southwestern Nigeria
Alkali Mohammed, Usman Lay and M.Y Adana 96

Assessment of Traffic Congestion in Karu Urban Area, Nasarawa State, Nigeria
Musa Eya Adamu, N. M. Idris, A. Mahmud 108

Assessment Of Tourism Potentials, Gurara Falls Niger State, Nigeria
Musa Eya Adamu, N. M. Idris, A. Mahmud 118

Mapping Erosion Risks And Vulnerability In Lafia Local Government Area, Nasarawa State, Nigeria Using Geospatial Techniques
Ekpo, A. S., Ozim, C. E., Chuwate, B. T. and Oladeinde S. O. 132

Spatial Analysis Of Land Use/Land Cover Change In Funtua Local Government Area Of Katsina State, Nigeria
Muhammad Isma'il, Saleh Aminu, Adam Modu Abbas and Ahmed Abubakar Jajere 150

Evaluation Of Landfilling, Incineration And Composting Using Life Cycle Analysis: Johor Bahru Case Study
Ahmad Halilu Abba, Zainura Zainon Noor, Rafiu Olasukanmi Yusuf, Nasiru Idris Medugu, Adati Ayuba Kadafa 164

Analysis of the Spatial Distribution Pattern of Healthcare Facilities in Gombe L.G.A., Nigeria
Ahmed Mohammed, Nasiru Umar Yusuf, Mohammed Isa Yusuf , Shehu Isa Yusuf 178

Subsistence Farmers' Adaptation Strategies to Climate Change in Niger State, Nigeria

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Abstract - Climate change and variability have far reaching implications on agricultural production, particularly on the livelihood of subsistence farmers in developing countries whose vulnerability is aggravated by multiple stresses. Adaptation has been identified as the key to sustaining agriculture, reducing the vulnerability of subsistence farmers and ensuring the survival of their livelihoods in a changing climate. This study examines the adaptation strategies by subsistence farmers in Niger State to climate change. Focused Group Discussions (FGDs) were conducted in 18 selected farming communities, across the three agricultural zones in the state. This is to ascertain the adaptation strategies employed by the communities, the effectiveness of the strategies and the limitations in adapting. The result shows that adaptation measures common to all communities are increased domestication of cattle, early planting, planting early maturing crop varieties, swapping to the cultivation of crops with higher profit turn over, cultivating crops tolerant to low soil nutrient, cultivating crops tolerant to drought, and digging of wells and bore holes to cope with the depleting water resources. Measures such as irrigation, involvement in off-farm jobs, introduction of new crops, bush fallowing, migration and establishment of new farmsteads do not have widespread application. Increased food crop yield, increased income from farming activities and sustenance of cattle during the dry season are identified as accruable benefits of adaptation strategies. Identified constraints are ownership of land in small holdings, rural

poverty, non-availability, inaccessibility, scarcity and expensive costs of tractors and inorganic fertilizer, and high cost of agro-chemicals. The study recommends the strengthening of capacities of farming communities to adapt by way of greater logistic support and technical aids.

Keywords: Adaptation, Subsistence, Farmers, Climate Change, Variability

1. Introduction

Climate change is unequivocally accepted as a reality [1] and the world community faces many risks from it [2]. Particularly, the inevitable changes in climate patterns undermine the services provided by ecosystems; thereby threatening peoples' livelihoods[3]. The agricultural sector in Sub-Saharan Africa is especially vulnerable to climate change because the region already endures high temperature and low rainfall [4]. Smallholder and subsistence farmers are particularly complex, diverse and risk-prone, because their farmlands which are generally small and most often held under traditional or informal tenure are in marginal or risk-prone environments [5]. Since their livelihoods depend on the use of natural resources, they are likely to bear the brunt of adverse impacts, and the extent to which these impacts are felt depends in large part on the extent of adaptation in response to climate change[6].

Rain-fed crop production characterized by low input and low output, is the basis of subsistence farming in most parts of Niger State and accounts for more than 95% of the land area cultivated annually. However, in all the communities surveyed by the researchers in the three agricultural zones, the participants unanimously agreed that they have progressively witnessed changing climatic trends which have resulted in environmental changes. The communities highlighted major consequences of the changing climate which make adaptation very imperative if the livelihoods and economic fortunes of the subsistence farmers who rely solely on agriculture must be sustained.

Globally, traditional farmers and indigenous local communities employ traditional knowledge, expertise, skills and practices in adapting to ensure food and livelihood security in diverse ecosystems ([7][8][9]). Adaptation has been defined as the modification in natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities [10] Particularly, African farmers have developed several adaptation strategies for coping with the current global climate variability, although such

strategies may be insufficient for projected future changes in climate[11]. This study therefore aims to examine adaptation strategies at the subsistence farmers' level in Niger State.

2. Study Area

Niger state is situated in the North-central Geo-political zone of Nigeria. It is located approximately between latitudes 8°20′N and 11°30′N, and longitude 3°30′E and 7°20′E (Figure 2.1).

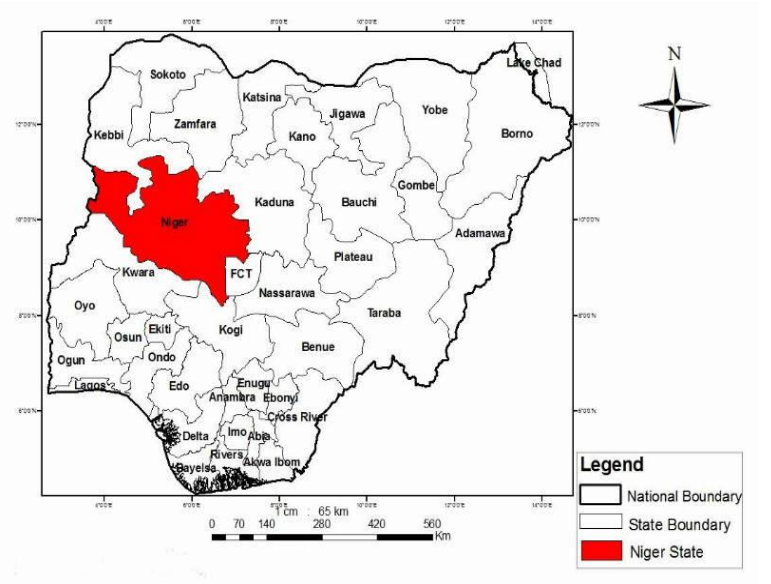

Figure 2.1 Nigeria Showing Niger State

Currently Niger State covers a total land area of about 76,363 sq. km (about 9 percent of Nigeria's total land area and the largest in size) and an estimated 80% of its land area suitable for agriculture. State experiences a distinct dry season (which lasts from October – March) and a wet season (which lasts from April – October). Annual rainfall in the state varies from an average of 1,200 mm in the northern part to about 1,600 mm in the southern part. The rainy season lasts for an average of 150 days in the Northern parts and about 210 days in the southern parts of the State. Mean maximum temperature remains high throughout the year, hovering about 32°C, particularly between March and June, while the minimum temperatures usually occur between December and January when most parts of the State come under the influence of the Tropical Continental air mass (Harmattan).

Agriculturally, Niger State is divided into three agricultural zones; Zones 1, 2

and 3. The zones are identified by the most dominant crops grown, even though most crops are grown all over the state. Agricultural Zone 1 is called rice and tuber zone, because rice is predominantly grown in large quantities across the local governments in the zone, and tuber zone because of the widespread cultivation of cassava in commercial quantities across the zone. Agricultural Zone 2 is called tuber zone because of the large scale cultivation of yam tubers in the zone. Agricultural Zone 3 is called cereal zone as it largely produces cereal crops especially millet, sorghum, and maize.

3. Methodology

The study primarily employed Focused Group Discussions (FGD) as its data source. The FGD is a qualitative method targeted at obtaining in-depth information on concepts, perceptions and ideas from a group. The FGD provided opportunities for group members to discuss the subject matter freely among themselves, with guidance from the facilitator. The FGD data was used to elucidate information on the actual climatic changes and variations witnessed by all surveyed communities, the impacts these impacts have had on the communities, the adaptation strategies that are being adopted by the communities to reduce vulnerability to observed changes as well as and the major constraints in adapting.

The FGDs were conducted with subsistence farmers in nine randomly selected local government areas (LGAs) of Niger State; three (3) from each agricultural zone, cutting across different climatic zones, tribes and cultures. The local governments are Gbako, Lapai and Mokwa for Zone 1, Gurara, Rafi and Shiroro for Zone 2; and Kontagora Magama and Wushishi for Zone 3. From each of the nine selected LGAs, two farming communities were randomly chosen. The selected communities are Muwo, Wuya Kede, Gbadafu, and Somazhiko, Duma and Takuti for Zone 1. For Zone 2, the selected communities include Shakwatu, Lashi, Gawu Babangida, Bonu, Tegina and Ungwar Batwu. Selected Communities in Zone 3 include Raba, Salka, Maito, Mailehe, Masuga and Kampanin Kiriya. Between 15 and 30 participants (drawn from the aged, middle-aged, youths and women) made up the focus group for each community.

4. Results and Discussions

4.1. Adaptation Strategies in Niger State

Results show that farmers across the three agricultural zones in Niger State have employed several adaptation measures to the observed climate related changes in land, water, atmosphere and vegetation.

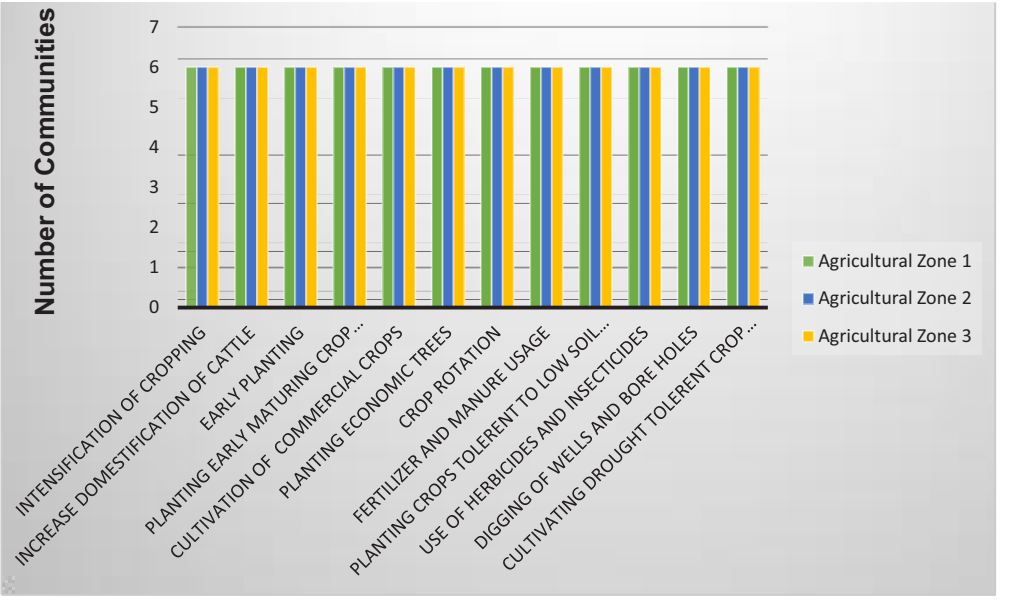

Figure 4.1 Adaptation Measures Common to all surveyed communities

Results show that farmers in all three zones have employed several adaptation measures to the observed climate related changes in land, water, atmosphere and vegetation. Figure 4.1 shows twelve (12) adaptation strategies that are common to all the 18 communities across the three agricultural zones. The strategies were adopted at individual levels; as there were no communal adaptation or mitigation measures in all the surveyed communities. The strategies are increased domestication of cattle, early planting, planting early maturing crop varieties, swapping to the cultivation of crops with higher profit turn over, and planting of economic trees. Others are crop rotation, fertilizer and manure usage, cultivating crops tolerant to low soil nutrient, cultivating crops tolerant to drought, use of herbicides and insecticides and digging of wells and bore holes to cope with the depleting water resources. The study however reveals some slight differences in some of these adaptation measures.

4.1.1 Introduction of New Crops/Crop Varieties

Subsistence farmers in all communities surveyed pointed out that they do not necessarily have to totally substitute all crop types traditionally cultivated in the communities. This is because there are no alternative crops that can thrive well under the prevailing climatic conditions of the communities. However, they have introduced a few more suitable crops to supplement the existing ones and adopted

varieties of the traditional crops that more adapted to the changing weather and climate.

In Agricultural Zone 1 *Glycine max* (soy or soya bean) often referred to as "wonder crop", was introduced in only two communities, while vegetables and spices were introduced in only one community. Wuya Kede is the only community in the Zone that has intensified upland crop cultivation as an adaptation to augment the dwindling livelihood from fishing. The community also adopted dry season irrigation, cultivating *Allium cepa* (onion), *Hibiscus esculentus* (Okro), *Amaranthus spinach*, *Lycopersicon esculentum* (tomato) and *Capsicum sp* (pepper). All communities in the zone introduced *Manihot palmata* (bitter variety cassava) and intensified its cultivation and legumes but reduced the cultivation of white yam because of decreasing yield. The legumes cultivated in commercial quantities in all upland communities in the zone are *Arachis hypogaea* (groundnut), *Vigna unguiculata* (cowpea or beans), and *Cucumis melo* (melon or egusi). The communities grow cassava, melon, beans (cowpea) and early maturing groundnut in commercial quantities because of their economic values, very short maturation periods, and ability do well in less fertile soils and little moisture, without fertilizer application. In addition farmers in two communities mentioned that although flood plains are prone to seasonal floods, insufficiency of arable land now compels them to cultivate such plains, since they possess fertile alluvial soils and often support high yield. As an adaptation, they often postpone the cultivation of rice till after the seasonal floods; planting early maturing varieties. The floodplain-dependent communities have intensified the cultivation of traditional crops like *Saccharum officinamum* (sugar cane) and rice in commercial quantities due to their higher turnover while non-floodplain dependent communities have introduced *Manihot esculentum* or edible cassava and upland variety of rice which is tolerant to lower soil moisture in commercial quantities.

In Agricultural Zone 2, soya bean was introduced in all communities. Agricultural Zone 2 adapts by changing to more tolerant, higher yielding yam varieties. With the exception of Tegina community, all other surveyed communities in Agricultural Zone 2 gradually replaced traditional varieties of *Dioscorea rotundata* (white yam) such as Suba, Leleyi, Gbaguso, Shakata, Suru, Gbazheboyi, Kpako, Amana, Efei, and Giwa whose yields were deteriorating due to changing climate and soil nutrient depletion. They introduced more tolerant varieties less susceptible to adverse conditions and have higher yields such as Sule, Lagos, Kwasu, Coach, Paper, Laushi, Nyangbazhi and Dindinya etc. Altering crop varieties, substituting plant types, cultivars and hybrids, with those with higher drought or heat tolerance possess potential to increase farm efficiency in the light of changing temperature and

moisture[12]. All the communities in this zone also plant and harvest cowpea leaves primarily for feeding and sustaining animals during the dry season, when pasture is virtually absent.

More food crops were introduced in Zone 3 than the other zones. All communities in the zone introduced crops like *Pennisetum typhodes* (late maturing millet), Okro, tomato, *Solanum melongena* (garden egg or eggplant), rice (early maturing variety), soy or soya bean), *Ipomoea batata* (Sweet potato), *Hibiscus sabdarifa* (sorrel, roselle), *Anacardium occidentale* (Cashew), while increasing white yam and cowpea. Decrease in cultivation of yam was attributed to reduced rainfall and poor soil fertility which result in dwindling yam yields, while decrease in cowpea production was attributed to the increased incidence of insects and diseases which tend to defy all available insecticides.

4.1.2 Increased Domestication of Cattle

All the communities visited are of the view that in recent times, they have intensified the rearing of these domestic animals (birds, sheep and goats) and introduced domestic cattle rearing, as a means of diversifying their livelihoods and complementing income from crop production and for generation of animal dung (farm-yard manure). This strategy has been identified by[13]. The reason advanced by the communities for the intensified rearing of animals is that that complement income from crop production. In addition, the animal dung from stalls or pens provides organic fertilizer; which is believed to be better, stronger and more lasting than the inorganic ones. The use of farm-yard manure is particularly beneficial to one community in Zone 2 which lays much more emphasis on the use of animal manure; especially poultry because it is stronger and lasts much longer than inorganic manure.

In spite of the enormous benefits of cattle rearing, the communities do not totally substitute cropping with livestock because it is (particularly cattle) expensive to purchase, difficult to rear and cannot be entirely relied upon. Moreover, the safety of the animals against invasion by thieves and cattle rustlers is often not guaranteed. In recent time, most communities in the state have been under frequent attack by cattle rustlers who have parted away with thousands of cattle. Furthermore, the discussions reveal that large scale animal production by the farmers is hampered by the difficulty in providing animal feeds during dry season and the prevalence of animal diseases during the raining season. Consequently two communities in Zone 2 left their cattle in custody of nomadic Fulani herdsmen because of the diminishing pasture (grazing) land and the difficulty of providing feed for domesticated animals.

Hence, the prediction by ([14][13]) that global livestock production will be hampered by changes in the availability of fodder and pastures, changes in areas from rangelands to unproductive shrub lands, and increased diseases and mortality of livestock is already evidenced across the state.

4.1.3 Intensification of Cultivation

All surveyed communities have intensified cropping and increased the cultivation of crops that that can considerably withstand drought and those that are more tolerant to low soil fertility in response to the comparative lower yield occasioned by decreasing rainfall and depleting soil fertility respectively. Two communities in Zone 1pointed out that although flood plains are prone to floods, insufficiency of arable land now makes them take the risk of cultivating such plains, because the plains possess fertile alluvial soils and often support high yield. In coping with the annual flood episodes, some farmers delay the cultivation of rice in the flood plains till after the flooding periods, often planting short duration varieties of rice which matures within three months. However, these varieties often have lower yields and normally fail in years of early rainfall cessation.

4.1.4 Use of Herbicides and Insecticides

In all the communities visited in the 3 zones, farmers have all adopted the use of insecticides of and herbicides especially those containing paraquat dichloride and related chemicals. The beneficial effects of herbicides as highlighted by the communities include effective control of some fast growing/emerging weed species, ease of labour, and improvement soil fertility in the short run. Also, the chemicals sometimes kill pests and reptiles and leads to improved crop yield. These findings are in agreement with the assertion by [12] that altering the intensity of agro-allied chemicals, capital and labour inputs could reduce the risks in farm production in the light of climate change. However, farmers in all the communities have noted that frequent application of chemicals increase crop production costs and reduce farmers' incomes.

4.1.5 Early Land Preparation

Another adaptation measure identified by most communities is early land preparations, especially the making of yam heaps. Early operations or preparations such as these are done as adaptation measures to cope with early rainfall cessation and late onset to pave the way for early planting at rainfall onset. Particularly, the study revealed that making of new yam heaps against the next

planting season traditionally used to commence September/October but now commences in August due to the uncertainty of rainfall cessation. Gbagyi speaking farming communities now take advantage of the new heaps to plant late maturing (dry season) melon to boost their livelihood.

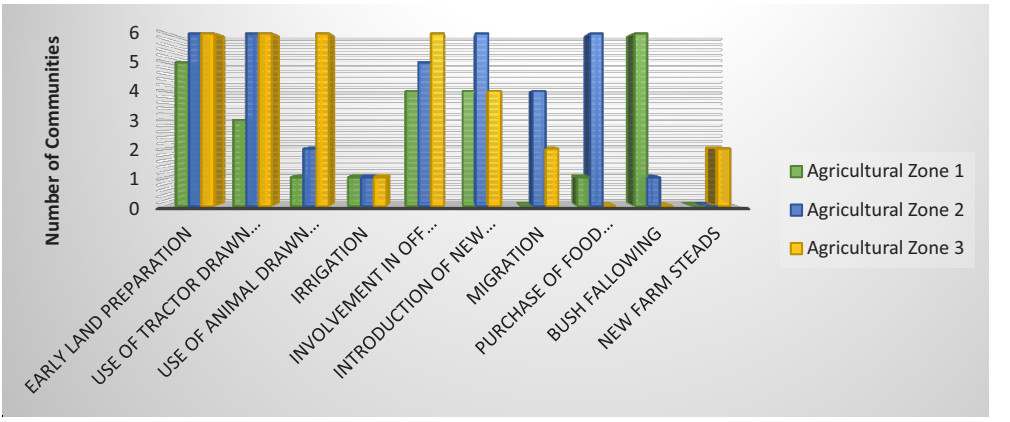

Figure 4.2 Other Adaptation Measures

Figure 4.2 shows other adaptation measures employed but not in all surveyed communities. The measures are early land preparation, use of tractor drawn implements, use of animal drawn implements, irrigation, and involvement in off-farm jobs. Others are introduction of new crops/varieties, purchase of food processing machines, bush fallowing, migration and establishment of new farmsteads.

4.1.6. Use of Farm Mechanization

The intensification of agricultural activities across the three zones is often facilitated with the use of farm mechanization. In Zone 1 only one community (Muwo) representing 5.6% of the surveyed communities uses both tractor-drawn and oxen drawn farm implements and possess some modern food processing machines. Two communities (Gbadafu and Takuti) or 11.1% of the surveyed communities use tractor drawn farm implements if available, while the rest hardly have access to tractors and therefore entirely rely on manual labour for soil tillage.

In agricultural Zone 2, all the communities use tractor-drawn farm implements when available but only two communities depend heavily on animal-drawn farm implements since tractors are hard to access, while the stony nature of land in another community hinders the use of animal drawn farm implements. In agricultural Zone 3 all communities use tractor-drawn farm implements when

available but rely very heavily on animal drawn implements which are readily available and affordable.

4.1.7. Bush Fallowing, Migration and Establishment of New Farmsteads

Migration by individuals or relocation of settlements have been discussed in various studies as a potential adaptive response option to climate change[15]. Figure 4.2 shows that the responses on adapting agricultural practices to climate change by practicing bush fallowing, permanent migration and the establishment of new farmsteads differed across the three agricultural zones. All the six communities in Zone 1 representing 33.33% of the communities surveyed still practice the traditional bush fallowing system. However, the fallow period has been considerably shortened from about 10-15 years in the past to a maximum of three years duration at present. They are however more often than not constrained by access to land due to land tenure system. Only a community in Zone 2 representing 5.6 % of the entire communities practice bush fallowing but the practice has ceased in all communities in Zone 3; the reason being that the rising population of the households exerts much pressure on the already insufficient available land which falls short of the demand for annual cultivation. All communities therefore adopt crop rotation as a major means of soil nutrient replenishment.

On permanent migration, four communities in Zone 2 representing 22.2% of the communities adopt permanent migration as an adaptation strategy. The communities migrate to other locations they consider to be more favourable and possess more fertile lands. Migration by individuals or relocation of settlements have been discussed in various studies as a potential adaptive response option to climate change [15]. Particularly, the Gbagyis in Zone 2 whose major livelihood is derived from yam cultivation have more readiness to permanently migrate to new locations they consider more favourable for yam cultivation in terms of fertilizer and agro-meteorological requirements. Only a community in Zone 3 (5.6 %) adopt permanent migration as adaptation strategy. However, all communities in Zone 1 are strictly sedentary, unwilling to migrate because they do not want to break ancestral family ties and are afraid of uncertainties in new locations. They therefore consider migration as undesirable adaptation.

In addition, as an adaptation to insufficiency of land, two communities (11.1%) in Zone 3 (Salka and Raba) resulted to establishing new farms (sabon-gonna in vernacular) far away from their communities where they construct farm steads during the growing season and sometimes stay a week or more on the farm before returning home, similar to[16].

4.1.8. Irrigation

Irrigation has been identified as an adaptation strategy that not only enhances the productivity of labour and land[17] but also leads to higher incomes and wages, and lower food prices[18]. However, the practice is not widespread in the state. Only three (11.7%) of the 18 communities surveyed practice irrigation. In Zone 1 it is practiced only in Wuya Kede on small scale. Here, some farmers take advantage of the perennial River Kaduna to cultivate vegetables during the dry season. In Zone 2 it is employed only in Gawu Babangida mostly by non-indigent migrant Hausa farmers (locally called Chinrani). In Zone 3 Maito community and its neighbouring villages, practice irrigation basically during the dry season as a way of adaptation since the commissioning of Tungan Kawo Dam (Wushishi) constructed by Niger River Basin Development Authority in 1982. The community has enjoyed tremendous benefits from the irrigation scheme, as it now cultivates rice twice a year. For other communities several reasons were highlighted for non-adoption of irrigation. The reasons range from the notion that irrigation has not been part of the communities' cultural practices traditionally (specifically in Zone 1) to the non-availability of perennial rivers and the absence of irrigation dams and facilities in most of the communities. Masuga Community in Zone 3 noted that the irrigation scheme which used to sustain the community during the dry season has now failed, because the erstwhile perennial stream used for that purpose now dries up during the dry season.

4.1.9 Off Farm Jobs

Except for two communities, the youths in all communities in Zone 1 now involve in off farm jobs such as tailoring, bricklaying, furniture making, auto-mechanics, and carpentry. Women, in addition to the traditional livelihood activities such as food harvesting, food processing and trading in food commodities now trade in provisions, engage in making soap and body cream, and own large farmlands mostly cultivated using hired labour, but often supplemented with their own labour. For Zone 2, five out of the six communities representing 27.8% of the entire surveyed communities now engage in similar off farm activities.

4.2. Effectiveness and Perceived Benefits of Adaptation

In responding to the question of the beneficial effects of adaptation, all the communities expressed some satisfaction with the employed adaptation strategies; since the measures have brought noticeable improvements. The communities specifically expressed that intensification of cultivation, early planting, use of

fertilizer, and use of herbicides have resulted in increased food crop yield, increased income from farming activities, and provided more opportunities for those engaged in food processing and traders of food stuff. In addition, farmers in two communities mentioned that although flood plains are prone to floods, insufficiency of arable land now makes them take the risk of cultivating such plains, because the plains possess fertile alluvial soils and often support high yield. Furthermore, all six communities in Zone 2 noted that planting of legumes specifically for feeding animals has helped sustained the animals during the dry season, when pasture is virtually absent. As rightly noted by [19], these adaptation measures in these communities could be said to have significantly reduced the negative impacts from changes in climatic.

The beneficial effects of herbicides as highlighted by the communities are that herbicides effectively control some stubborn weeds, reduce farm labour, increase soil fertility and sometimes kill pests and reptiles, while use of insecticides now leads to improved beans yield. Thus, altering the intensity of chemicals capital and labour inputs has the potential to reduce the risks in farm production in the light of climate change [12]. By and large, these adaptation measures have the potentials to significantly contribute to reductions in negative impacts from changes in climatic conditions as well as other changing socioeconomic conditions [19] in those communities. However, for countries located in tropical regions, the potential benefits of low-cost adaptation measures such as changes in planting dates, crop mixes, and cultivars are not expected to be sufficient to offset the significant climate change damages[20].

4.3. Constraints in Adaptation

From all the communities surveyed however, notable problems arising from some adaptation strategies were expressed. A major problem expressed by all communities is that early planting is often hampered by the prolonged dry spell at the beginning of the rainy season which often leads to the decay of planted seeds especially yam (before or after germination), withering, dying of young crop seedlings and stunting of plants growth. These often lead to crop failure and consequently necessitating re-planting of failed crops. Secondly, that the use of tractors weakens the soil and contributes to rapid soil nutrient depletion or exhaustion. Also, in most communities, there is a difficulty in providing animal feeds during dry season as well as the prevalence of animal diseases during the rainy season. This consequently hampers large scale animal rearing. This is supported by the prediction that livestock production will suffer due to changes in the availability

of fodder and pastures [14], deteriorated rangeland quality, and increased diseases and mortality of livestock and/or forced sales[13]. In addition to these problems, one community observed that lack of proper enlightenment on the appropriate choice and application of herbicide sometimes results in the destruction of the entire cultivated crops alongside the weeds. Furthermore, in Zone 2, five of the six communities revealed that continuous overturning of the soil with the use of tractors during ploughing as well as use of herbicides in the long run weaken the soil and introduce *Striga Hamontica* and leafy weeds (*such as Chromolaena odorata, Ageratum conyzoides and Hyptis suoveolens*). The leafy plants are believed to grow faster than grass; increase the population of termites, and lead to rapid soil nutrient depletion and erosion. Masuga Community in Zone 3 lamented that the irrigation scheme which used to sustain the community during the dry season has now failed, because the erstwhile perennial stream used for that purpose now dries up during the dry season.

In all the communities, it was pointed out that there are major constraints militating against successful adaptation. Intensification of cropping and bush fallowing are hampered by ownership of land in small holdings; which necessitates leasing of farmlands from those who have adequate lands (often paid for by using farm produce), triggers communal clashes or farmers–nomads clashes, and discourages farm mechanization. Another implication is that this has mostly happened through conversion of forest and grasslands and shortening of fallows[18]. Therefore, Agricultural intensification and/or expansion into marginal lands can cause crop failure, exacerbate environmental degradation [21] and reduce biodiversity[22].

5. Conclusion

There is a dire need for the capacities of farming communities to adapt to climate change to be strengthened if the gains from adaptation must be sustained and maximized. This calls for support such as amenities, infrastructures, training and technical aid, sensitization and useful information, monetary donations, credit facilities, modern efficient storage facilities, modern efficient, affordable but non-sophisticated farm machinery etc. to farming communities.

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