

An Overview of Challenges on Smallholder Agroforestry Farms in Jigawa State, Northern Nigeria

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Abstract

Under the threat from a cocktail of climate change, environmental and soil, degradation and present economic meltdown in the country and world over, the practice of agroforestry come under a myriad of challenges. This study looks at Jigawa state, which has an agrarian based economy. With an estimate of 0.8ha being the average size of farmlands in the state, this study attempts to outline the pressing challenges facing these smallholder farms. A multistage sampling was employed for the study. Using division of the state into 3 zones which include; Jigawa southwest, Jigawa northwest, Jigawa northeast and. Out of each zone, 3LGA were selected out of which 50 respondents were purposively targeted from each community providing the study with sampling frame of 450 respondents. The analysis proceeded by using mean, percentages and use of table and figures. The results show that tenure insecurity, herder problems as challenges to the farmers. Laxity on part of the institutions adds to the list. The study recommends the revitalization of relevant bodies charged with maintenance and dissemination of information and incentives on use of modern agroforestry to ensure its sustainability.

Keywords: Agroforestry, Smallholder, Tenure insecurity, Herder Problem

1.0 Introduction

Jigawa with an estimated land area of 23,400km², which translates into 2.36% of total landmass of Nigeria is one of the of the states classed as facing the threat of desertification(Olagunju 2015). Approximately 82% of the population of Jigawa state are smallholder farmers. These farmers still trudge along the farming landscape with rudimentary tools relying on rain-fed agriculture. The average size of 80% of these farmlands in Jigawa are less than 2.5 ha (Hadeija and Smith 2017).

The threat of the cocktail of environmental degradation, climate change and present economic meltdown in the country an world over, are formidable enemies for the any agricultural production system. To achieve food security, an effective but sustainable system needs to emerge (UNEP 2008).

Several researchers see the practice of agroforestry as viable option for the resource poor farmer ((Ekwugha 2016; Mbow et al 2014; Jamala, et al. 2013). Agroforestry has been an age-old practice. Its reinvigoration with fortification from scientific research and application through greater awareness in a more intensified manner ease the burden on the farming landscape (Nair 2009).

Smallholder farmers in Jigawa as in other parts of northern Nigeria have always employed the use of fallows. However in recent years, increase in population and ever increasing demand to achieve food security has led to decline in use of natural fallows (Jamala, et al, 2013; Hassan, 2004). Although agroforestry by itself is prescribed to the smallholder farmer in various areas as having the propensity to tackle the problem of food security. The practice itself faces several challenges. Addressing these challenges must take center place to ensure the sustainability of the practice in Jigawa.

2.0 Study Area

Jigawa State is located in the northwestern region of Nigeria. The State is bounded to the north by the Niger Republic, to east by Bauchi and Yobe State, south by Kano State and to the west by Katsina State (Kabiru, 1998). It lies within latitudes 11.00°N to 13.00°N and longitudes 8.00°E to 10.15°E It covers an estimated area of 23,400 km² (8,940 sq. miles). The area is located and categorized as hot-dry semi-arid climate with hot season and cold dry season. The mean annual rainfall of the area is about 800 mm and evapotranspiration of 1600 (Abubakar et al, 2010). The region is characterized by low rainfall (850-870mm) and high rainfall of about 4200mm in a wet year Olofin and Tanko (2002).

Geologically, Sedimentary Chad Formation underlies the eastern part of the state. Basement complex underlie the northwestern part of Jigawa, while intrusions of younger granites are in southern parts of the state (Olofin, 1997, p. 17). The vegetation in the state is Sudan savanna with sparse bushes, open grassland. Trees common here include variety of species like *Faidherbia albida*, *Acacia seyal*, *Parkia biglobosa*, and *Anogeissus leiocarpus*. Presence of long taproot and leathery leaves enables these trees to adapt to drought conditions (Dakata and Yelwa, 2012).The area of basement complex formation slopes gently and crosses the hydrogeological divide toward the chad formation. This give rise to diverse trees and shrubs, with quite a number having edible seeds and fruits, the leaves as fodder, the fiber and trunks as firewood, others medicinal

importance. The area is mainly agrarian (agriculturally dependent), and it is divided into 3 Geo-administrative zones. They include Jigawa northwest, Jigawa northeast, and Jigawa southwest

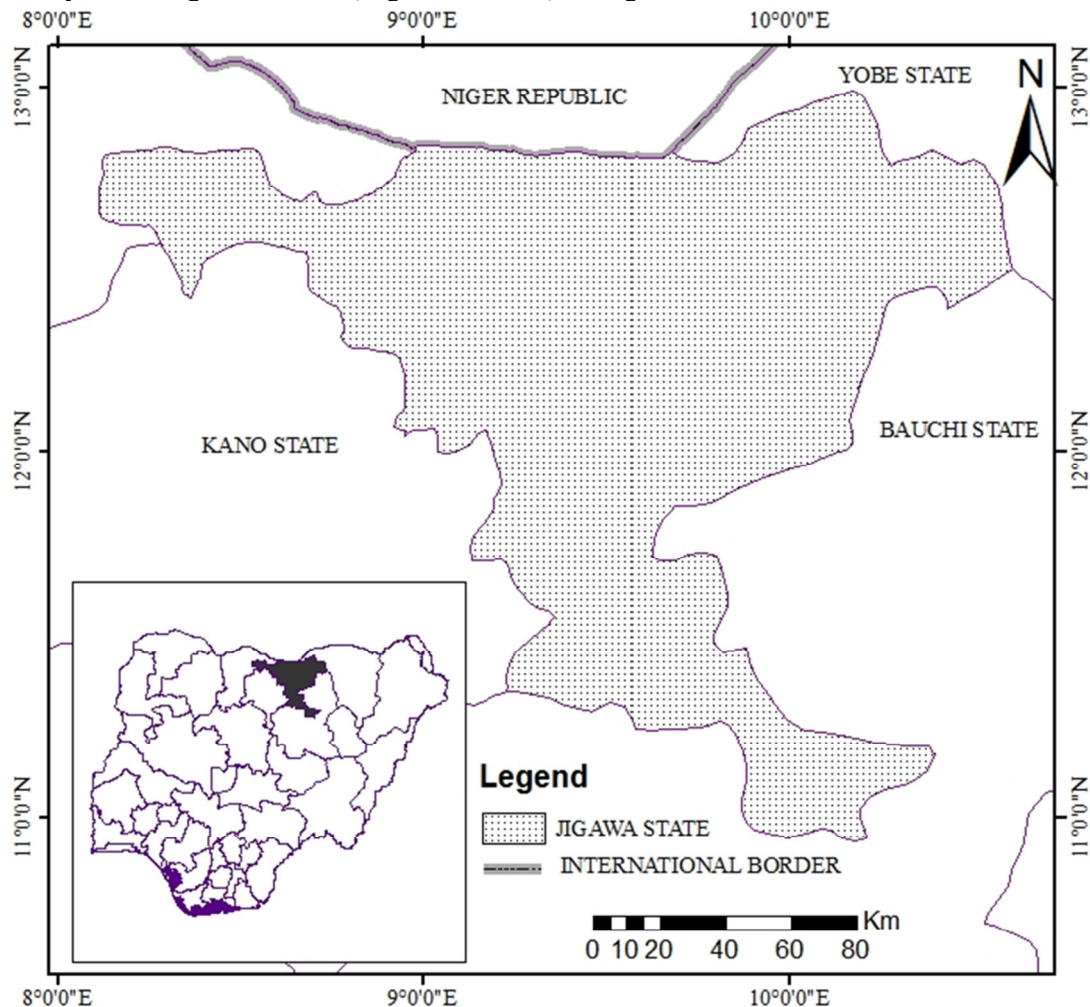


Figure 1: location of Study area

The National population commission 2006 census records the population of the state at 4.3million (NPC 2010). The people of the state are mainly Farmers, traders; other occupations include blacksmithing, leatherwork, calabash carving and mat weaving. (Hassan, 2004)

3.0 Material and Methods

A random sample selection was used in sampling three local governments from each of the 3-geo administrative zones (senatorial districts) in the study area. Three farming settlements were then purposively selected in each LGA employing sampling technique to make a sum total of nine. In each of the 3 sampled farming communities, a purposive sampling was employed in selecting 50 respondents and semi-structured questionnaire was administered on them. A total number of 450 farmers were sampled to make up the total respondents for the study.

4.0 Data analysis. The use of simple descriptive statistics was employed in analyzing data collected on the problems of the practice. These include percentages, frequency distribution, tables, and charts. The responses on problems were tabulated and the use of bar charts used to elucidate the distribution across the study area.

5.0 Problems of Agroforestry

Given the vast potential for agroforestry to be a solution to the resource poor farmer in the rural area of the study area, the adoption of the practice is fraught with a number of problems. Some of the identified problems in the area include the following, competing demands over land, Inadequate capital, tenure Insecurity, ineffective Institutional Support and herder Problems.

Table 1: Percentage Distribution of the problems of agroforestry

Problems	Jigawa northwest		Jigawa northeast		Jigawa southwest		Total
	NO.	(%)	NO.	%	NO.	%	
Tenure Insecurity	128	85	133	88	98	76	83
Inadequate capital	129	86	113	76	110	73	78
Herder Problems	123	82	138	92	122	81	86
Ineffective Institutional Support	112	75	135	90	83	55	73

Fieldwork 2015 *multiple responses shows percentages to be more than 100

Table 1 shows that the difficulties faced by local farmers which hinder the adoption of the practices on their individual farms in the study area. These include land tenure problems, land sizes (small and fragmented farmland holdings), lack of technical knowhow, non-availability of tree seedlings, Herder Problems, Ineffective Institutional Support and trees casting shadow on crops among others.

5.1. Tenure Insecurity:

This phenomenon of ownership according to Ajayi (2007) affects agroforestry in accordance to the spatial location plus the cultural background that is widespread in the area. It also relies on the fact whether the innovation is either a tree-based or shrub. Akinnifesi et al. (2008) confesses that a shrub based encounters less challenges in comparison to tree based technology.

Olorunke et al (2014) reported that a recurring decimal in the farming landscape is issue of ownership, which affects the production system. This applies also to the farmers using agroforestry. 88.8% of respondents in Jigawa northeast and 85.6% of the respondents in and Jigawa northwest described tenure insecurity presenting an obstacle. It counters the smooth running of the practice on their farms. Farmers within Jigawa southwest 74.7% of them report considered it drawback.

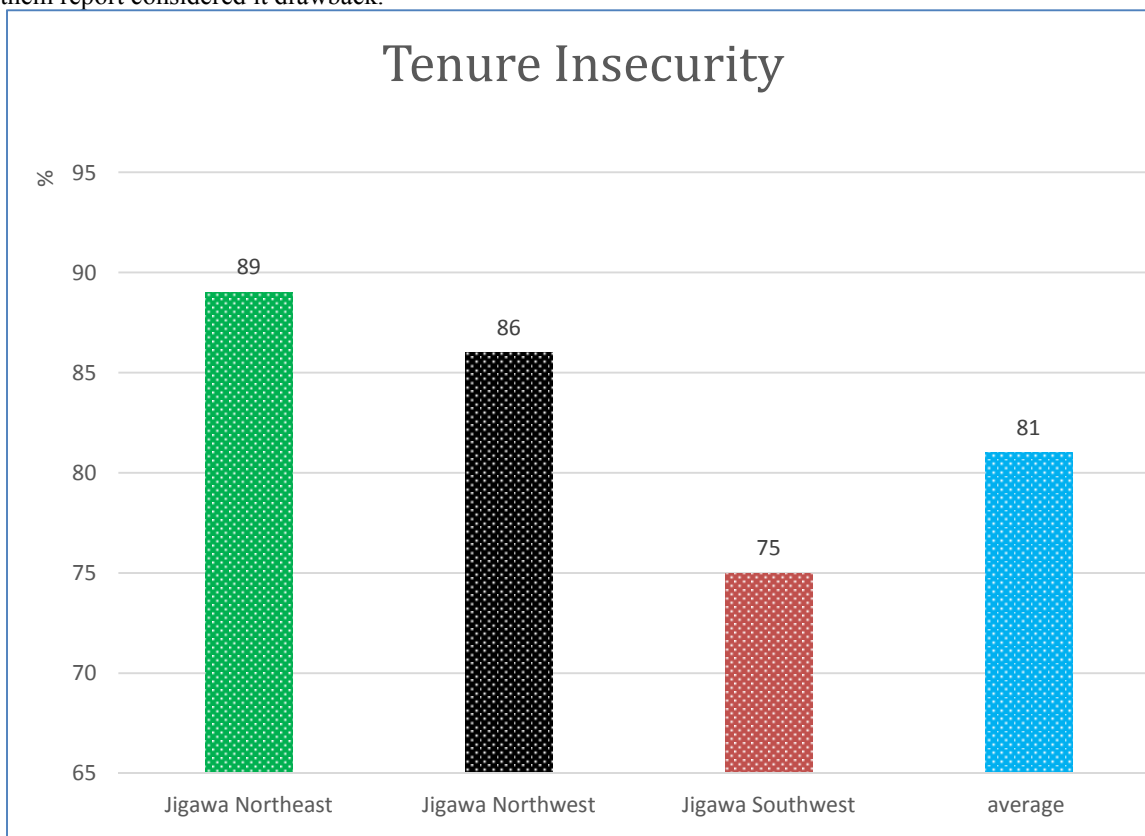


Figure 2: Tenure Insecurity

Thus, a hurdle constraining agroforestry in Jigawa is the persistent issue of ownership (Tree tenure). Tenure insecurity could be crucial factor marring the success of the practice. Table 1 shows the average response totaling 81% who believed tree tenure as a retarding factor of the practice. Figure 2 gives a vivid representation of the problem in the area. The study further showed that about (43%) acquired their land through lease (Jingina) while 48% acquired their land through inheritance. 9% of farmers got their lands through purchases. The implication is this method of ownership has an impact on the practice.

Table 2: Percentage of acquisition methods

Means of Acquisition	Total (%)
Leasing	43
Inheritance	48
Purchase(Bought)	9
Total	100

Fieldwork 2015

Figure 3 below, depicts the method of ownership acquisition of farmlands namely: Leasing, Inheritance and outright purchase.

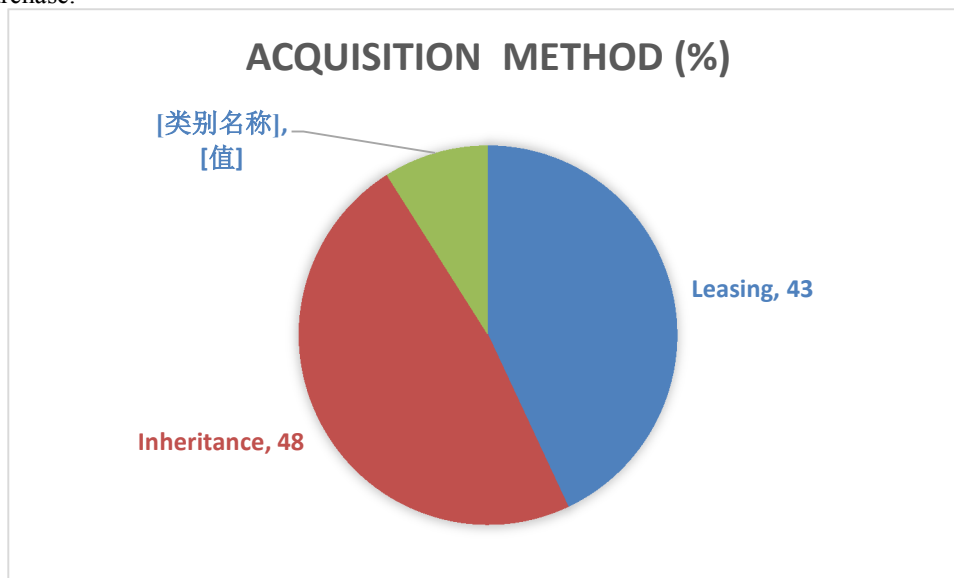


Figure 3: Acquisition method of farmlands

In a leasing arrangement, the owners of the farmlands are not keen on allowing the farmer to plant trees. The owner allows the planting of any crop of the choice of the farmer like millet, groundnut, etc. Permission is needed from the owner in planting big trees on the land. This demoralize the farmer and inhibits him from planting useful trees because if he does so, he may breach the contractual agreement. Claim of ownership belongs to the owner and not the farmer for any tree found on the land. The owner could decide to sell or trade off the tree for any amount at any given time. This then negates any intended use the farmer may have for the given tree.

The farmers able to own trees on their lands are those who inherited the lands from generations of their grandparents and parents. Among the sampled respondents, more farmers in Jigawa northwest acquired their lands through inheritance and purchase (bought by themselves). Due to status of ownership, they require no permission and may be more receptive to maintain trees on the land. The farmer who borrows (Aro)¹ and/or lease² have no such luxury because they are under restricted access.

5.2. Inadequate Capital

Masebo.N and Menamo.M (2016) Emphasizes that when you feed and empower the poor, you indirectly invest in environmental protection. This is because environmental degradation and poverty as reiterated by (Selamyehun, 2004;) gives rise to the chicken and egg conundrum. The poverty-stricken rural poor causes environmental degradation through practice such as deforestation, unwholesome farming practice like over cultivation leading to loss of resilience of the soil and eventually loss of agricultural output((Robert.J *et al.*, 2008.)). The vicious circle of poverty –environmental degradation now ensues.

In recent years, research is shifting into finding and introducing more agroforestry trees that help boosting fertility thereby complementing yield (Quinion, 2010). The trees are termed fertilizer trees. They have the propensity to reduce poverty. However due to insufficient resources on the part of the farmer, he may find it difficult even when these trees are put at his disposal. Thus, it is mandatory for further research into how these trees can sustainably maintain the livelihood through reduction of poverty.

Poverty is a recurring decimal when discussing the problems of the practice according to the respondents. Both table 1 and figure 4 respectively show that 78.7% believe that poverty or inadequate capital in

¹ Aro : In local Hausa dialect means to borrow

² Lease is when an owner gives out his land under contract over a couple of year in return for cash

the study is a limiting factor to the progression of agroforestry. Percentage distributions are 76% in Jigawa northeast, 87% Jigawa northwest, 74% Jigawa southwest.

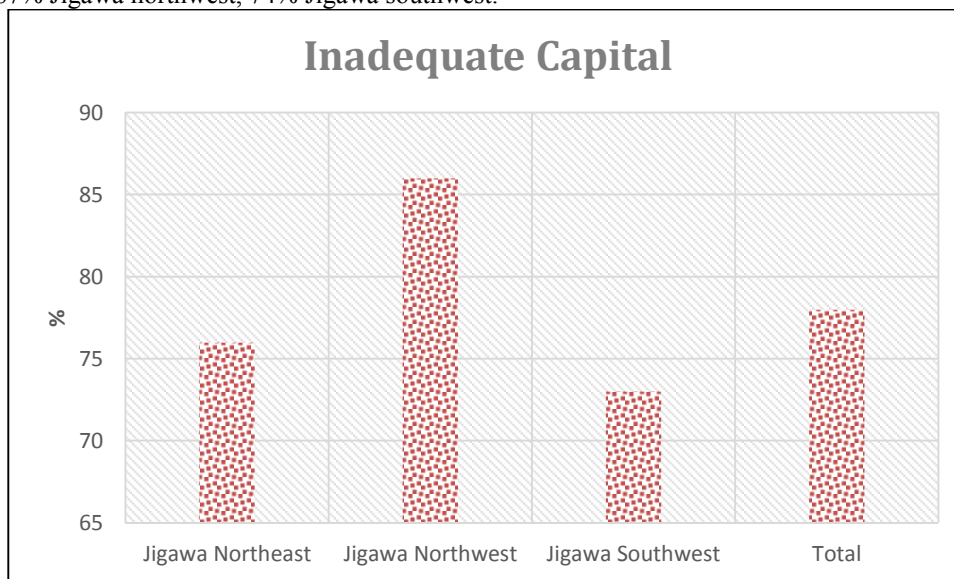


Figure 4: Inadequate capital

Two separate farmers related an example typifying the effects of poverty in Jigawa northeast. One of the respondent revealed a transaction in which due to lack of funds, he got the sum of just 3000 naira (8 dollars) for the sale of one of his nitrogen-fixing trees *Faidherbia albida* tree (Apple-thorn). In local Hausa dialect, “Gawo” is the name given to this tree. The implication of this is that the adoption of the practice is compromised by such actions. In the long term, the farmers lose on both sides of the coin. They lose from the environmental perspective through loss of inherent nitrogen fixing of the tree to the soil.

5.3. Herder Problems

Conflicts between local sedentary farming and the dynamic nomadic and Fulani herdsmen are a recurring decimal on the agricultural landscape. The need for grazing land has in recent times has come in conflict with the ever expansion of agriculture. The expansion has been driven by the burgeoning increase in the population (Tonah, 2006). Expanding farmlands are gradually eating into grazing tracks or paths for cattle. Formally, these paths are referred to as stock routes. Their establishment is enshrined in the Nigerian Constitution (Hassan 2001,p. 12) . In Jigawa these route run through several local governments Gwiwa,Yankwashi in northwest, through Ringim Dutse Birnin Kudu in southwestern Jigawa. This conflict is seen as a duel for scarce environmental resource, which include trees, and cropland.

The herdsman (herders) now have greater difficulty of passage in accessing local pastures. The situation making it hard for him in to moving his cattle without tampering with crops on the farm. Straying of livestock into farms has reached crisis point for the people of Jigawa because it has resulted in fatal clashes and loss of livelihood. Responses from farmers in table 1 relate that multipurpose trees which in addition to possessing nitrogen-fixing capability such as *Faidherbia albida* and *Parkia biglobosa* (locust bean tree) tend to attract herdsmen and their livestock.

Farmers’ revelation in table 1 shows that herders find species like locust bean tree (*Parkia biglobosa*) are rich in fodder. The fruit is very rich with high protein content. Occasionally they stray into farmlands destroying crops causing a sense of outrage from the farmers. This more often than not led to clashes that may lead to loss of life and property. Naturally, the farmers allow herders on to their field after harvest season and not during the cropping season.

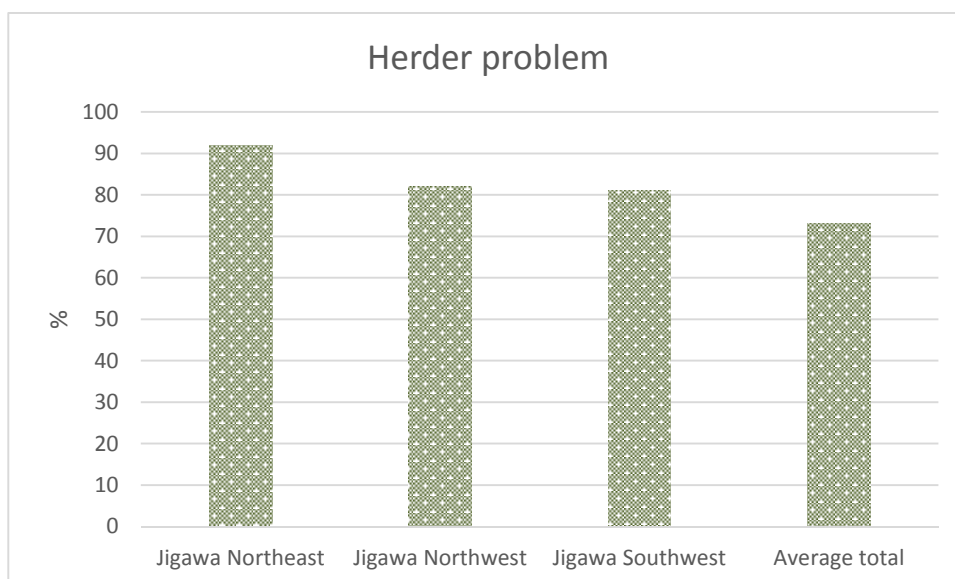


Figure 5: Herders

Table 1 further depicts the difficulty associated with herders to agroforestry farmers in the study area. Jigawa North East showed the highest degree of response 92%. Jigawa North west follows with 82% and in southwest Jigawa, which exhibited the least response level, the value, was 81%.

By implication, the respondents relate that besides crop loss, herders' now come round with sophisticated arms. Some of the respondents (farmers) confessed that they sometimes contemplate removing these trees from their land despite the benefits. Several respondents around Dutse Local government area, lay claim that the issues of stray camels on to farmlands causes decrease in yield, which the farmers attribute to the pungent nature of their urine reacting with the soil. From the study, clashes destabilizes the society, which may translate into communal insecurity and general instability (Audu 2013).



1: herdsmen NAN

NAN September,2016

Plate

5.4. Institutional support

Within the area, the state government through JARDA distribute viable seedlings to farmers. Sabo (2005) reports that provision of seeds for food crop gets more priority. Tree seedlings come in second. It is safe to say that government red tape and lack of supervision of all gang up against effectiveness of service delivery to the farmer. In congruence with the findings of Saminu (2011), refocusing the goals of these government agencies is the way forward if this challenge is to be defeated.

Unless these institutions take revitalization serious, the trend of under use of the potential of the practice will ensue. This finding is similar to findings of Saminu (2011) in a study in Katsina.

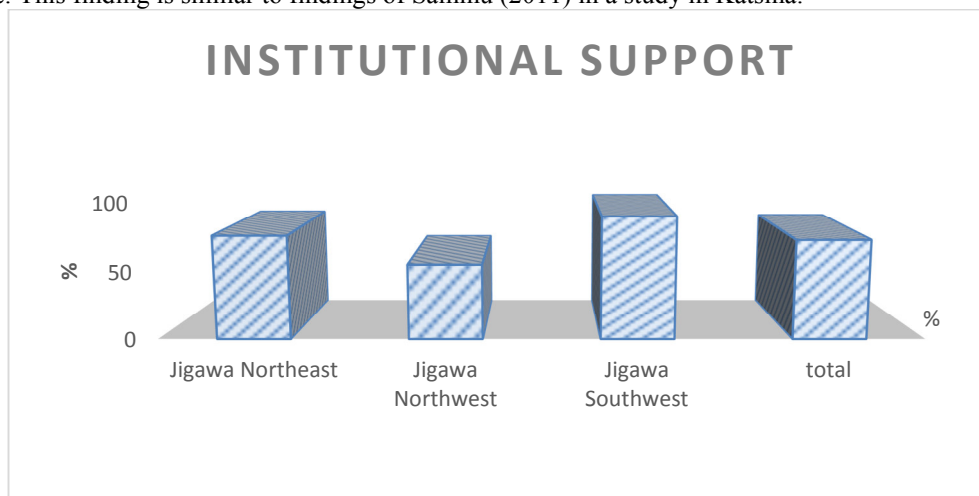


Figure 6: Institutional support in study area

Response on the inefficient support offered by intuitions in area shows Jigawa southwest with 89.8%. Farmers in Jigawa northwest elicited a response of 74.6%. Southwestern Jigawa elicited 55%. The reason for having lower percentage could be the proximity to the state capital. They are able to interact more with some of the parastals as opposed other zones.

An illustration of the inefficient support offered by institutions in the area can be seen in figure 7 (seven). Respondents say services of extension agents in the area are skeletal. Political affiliation is by far on of the factors accentuating this issue of institutional support. A worthwhile project started by the previous government was jettisoned not for lack of merit but mere politics. These sorts of decisions do not go down well with the farmer who eventually endures the negative effects of these makeshift policies.

6.0 Conclusion

The study examined the challenges faced by the farmer in in the sampled 3 zones of Jigawa. Namely, the zones consist of Jigawa northwest, Jigawa northeast and Jigawa southwest. The average farm size of the farms in the study area is approximately 0.8 ha. There are many challenges in the area to these smallholder farms but the major ones include; lack of tree seedlings and tenure insecurity respectively were the challenges militating against their practice. Problem of herders among respondents (86%) was a particular source of worry to the farmers. Interference of politics into the fray is a problem that threatens the whole institution of both the conventional and the agroforestry farmers alike. The state owned institutions are dozing off in their services and need to wake up. In line with the findings of this study, it is pertinent that the following recommendations receive adequate attention:

- The bodies handling state laws should strengthen already existing laws that grant the herders protection to the stock routes enshrined in the Nigerian constitution.
- Plant propagation projects should be initiated to promote wide range of indigenous species that can adapt to the local conditions of Jigawa.
- There is need to enact policies aimed at minimizing conflicts between pastoralists and sedentary farmers.

REFERENCES

- Abubakar. M.S. and Ahmad. D. (2010) Utilization of and Constraints on Animal Traction in Jigawa State, Nigeria. *Australian Journal of Basic and Applied Sciences*, 4(6): 1152-1156,
- Adedapo J. O.(2014) The Role Of Agroforestry Practices In Sustainable Land Management In Rural Areas Of Kaduna State, Nigeria. Unpublished MSc Thesis Submitted to Department of geography Ahmadu Bello University, Zaria.
- Adedayo A.G., Oluronke S. (2014) Farmers' Perception and Adoption of Agroforestry Practices in Osun State, Nigeria. *Forest Res* 3: 127.
- Ajayi OC , Akinnifesi FK, Gudeta S, Chakeredza S (2007) Adoption of Renewable Soil Fertility Replenishment Technologies in Southern African Region: Lessons Learnt and the Way Forward. *Natural Resource Forum* 31 (4): 306-317
- Akinnifesi FK, Sileshi G, Ajayi OC, Chirwa PW, Kwesiga F, Harawa R (2008) Contributions of agroforestry research and development to livelihood of smallholder farmers in Southern Africa: 2. Fruit, medicinal,

- fuelwood and
- Audu, S.D (2013). Conflicts among Farmers and Pastoralists in Northern Nigeria Induced by Freshwater Scarcity *Journal of Environmental and earth science Developing Country Studies Vol.3, No.12, 2 ISSN 2224-607X Biodiversity Journal, 4(3):427-434*
- Dakata F. A. G. and Yelwa S A. (2012) ,An Assessment of mean and inter-seasonal variation during growing season across Kano region, Nigeria using Normalized Difference Vegetation Index derived from SPOT satellite data. Unpublished MSc Thesis Usman Danfodio University
- David.O.O., Jamala G. Y., (2013), Traditional Agroforestry Practice and Woody Conservation in derived Savanna ecosystem of Adamawa *Internaional organization of scientific Research journal*
- Ekwugha, U. E.(2016), Impacts of Agroforestry Technologies on Watershed Management in Imo State, Southeastern Nigeria *Nigerian Journal of PH Agriculture, Food and Environment. Vol.12 (1):12-16* Fodder tree systems. *Agricultural Journal 3 (1): 76-88*
- Hadejia .I, Smith. A (2017), Improving economic empowerment through the development of cluster farming initiatives in Jigawa State Paper presented at the “2017 World Bank Conference on Land and Poverty “The World Bank - Washington Dc.
- Hassan .U.B (2004), Conflict between Farmers and Pastoralists in Jigawa state; A study of Birniwa and Kirikasmma Local government areas. Unpublished MSc Thesis Submitted to Department of geography Bayero University Kano
- Kabiru, A. (1998), “Status of Benniseed in Jigawa State.” **In:** Proceedings of the first National Workshop on Benniseed, 3-5 March 1998 Badegi, pp 136-143
- Masebo.N and Menamo.M (2016), A Review Paper on: The Role of Agroforestry for Rehabilitation of Degraded Soil *Journal of Biology, Agriculture and Healthcare Vol.6, .(5), ISSN 2224-3208*
- Mbow, C., Noodwijk M., Prabhu R., Simons, A. (2014), Knowledge gaps and research needs concerning agroforestry’s contribution to Sustainable Development Goals in Africa. *Environmental Sustainability Vol. 6. 162-170*
- Nair PKR, Kumar BM, Nair V.D (2009), Agroforestry as a strategy for carbon sequestration. *J Plant Nutrition Soil Science 172:10–23*
- NPC (2010) ,Nigeria population commission Report Abuja. Federal Republic of Nigeria.
- Olaagunju.E.T, (2015) Drought, desertification and the Nigerian environment: A review *Journal of ecology and Natural Environment Vol. (7) 7*
- Ofuoku. A. U. and. Isife, B. I (2009), Causes, effects and resolution of farmers-nomadic cattle herders’ conflict in Delta state, Nigeria *International Journal of Sociology and Anthropology Vol. 1(2) pp. 047-054*
- Oluronke S.A., Olubunmi.S.O., .Amadi D.C AND Idigie D (2014), An assessment of agroforestry practice as a land use option for Biodiversity conservation in Osun state. *Journal of biodiversity and ecological science vol.(5)2*
- Olofin, E. A (1987), Some aspects of the physical geography of the Kano region and related human responses. Departmental Lecture Note Series: Geography Department, Bayero University. Debis Standard Printers, Kano, Nigeria
- Quinion. A., • Chirwa . P.W., • Akinnifesi. F. K., • Ajayi. O. C.(2010), Do agroforestry technologies improve the livelihoods of the resource poor farmers? Evidence from Kasungu and Machinga districts of Malawi. *Agroforest Systems DOI 10.1007/s10457-010-9318-7*
- Robert J. Zomer A, Antonio Trabucco B,C, Deborah A. Bossio C, Louis V. Verchot A World Agroforestry Centre.(2008) Climate change mitigation: A spatial analysis of global land suitability for clean development mechanism afforestation and reforestation. *Agriculture, Ecosystems and Environment 126: 67–80, Nairobi, Kenya*
- Sabo. U.U, (2005) Impact of Participatory Extension Activities on Sesame production in Ringim and Taura local government areas of Jigawa state A Thesis Submitted to the Post-graduate School, Ahmadu Bello University, Zaria
- Saminu U.D, (2011), An Assessment of tree density and Diversity on smallholder farm Parkland agroforestry systems in Daura. Unpublished MSc Thesis Submitted to Department of geography Bayero University Kano.
- Selamyehun K. (2004), Using Eucalyptus saligna for soil and water conservation on the highland vertisols of Ethiopia .PhD thesis, Wagenign University
- Tonah S (2006), Managing Farmer-Herder Conflicts in Ghana’s Volta Basin. Ibadan *Journal of Social Sciences 4(1): 33-45*
- UNEP. (2007). Global Environment Outlook GEO 4 environment for development, Valletta (Malta): Progress Press Ltd. 540pp.