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PERCEPTION OF ARABLE CROP FARMERS ON AGRO-FORESTRY PRACTICES IN SELECTED LOCAL GOVERNMENT AREAS IN EKITI STATE, NIGERIA.

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ABSTRACT
This study examined the arable crop farmers' perception on Agroforestry practices in Ekiti State, Nigeria. Multi-stage sampling technique was used to collect data from two hundred and forty (240) respondents. Descriptive and ordinal measured statistics were used in data analysis. The results showed that 93% of the respondents were educated, whereas, 59.2%, 62.9 and 72.9% of the respondents were married, male and Christians respectively and made up of farmers with age bracket between 31 – 50 years old, majority of the respondents had household size between 6 and 10 persons. The study also showed that respondents who cultivated less than 1 ha of farmland were 49.6% while those that had no access to formal credit were (84.2%). The results from Likert scale on farmers perception based on the mean scores of (3.0) showed that 67.9% of the respondents affirmed that Agroforestry practices was profitable and favourable. However, the major constrains to Agroforestry practices in the study area based on the average mean score of 2.5 were fire outbreak with severity index of 3.10, non-availability of seeds/seedlings (2.81), time consuming (2.65), Pest/rodents and diseases (2.64), whereas , land tenure and long gestation period had mean severity index of 2.6% and 2.59% respectively. Conclusion drawn from the study is that the agroforestry systems was an alternative agricultural practices adopted by some arable crops farmers to increase their income and forest products in the study area, while incident of fire out-break should be checked to prevent loss of crop, land and farmers income.

Key Word: Adoption, Agroforestry, Arable crops, Farmers, Perception and Practices.

INTRODUCTION

Several regions throughout the world have encouraged the use of agroforestry techniques to increase the efficiency and biodiversity of agricultural activities, (Sabastian, et al., 2019)., because agroforestry, is an age long technology which civilized farmers have used to sustain their food production systems (Adeola, 2015), this system is one of the best known traditional practices for an independent livelihood, suitable land management and sustainable development (Parihaar, et al., 2015).

Literarily agroforestry is the practice of growing trees alongside with annual crops, raising livestock, and other forms of

agricultural practices on the same plot of land in order to maximize productivity, this is possible because the different components of agroforestry can increase output when they have complementary advantage and their association are being, well-managed (Place et al., 2022). It encompasses all practices where trees and shrubs are planted alongside with agricultural crops and/or animals with the intention of increasing productivity.

Leakey,(2022). adopted the International Centre for Research in Agroforestry (ICRAF) definition of agroforestry, which described agroforestry as a collective name for land-use systems and practices in which woody perennials are deliberately integrated with crops and/or animals on the same land-management unit, the integration can be either in a spatial mixture or in a temporal sequence, also in order to increase socio-economic and ecological benefits, agroforestry (AF) is defined as a dynamic and ecologically based natural resources management asset (Prabhu et al., 2015).

However, Agroforestry is a land management system that combines the production of forest trees and food crops, with or without livestock, in a way that is both technically and economically feasible and will allow the small holder farmer to obtain high income and living standards while also ensuring improvement of soil and the environment (Ibrahim, 2019). Consequently agroforestry is a sustainable land management strategy that may aid in revitalizing soils and maintaining life-supporting activities on the agricultural fields of arable crop farmers, this includes all practices that deliberately combine trees and shrubs with agricultural crops and/or livestock overtime or space.

The goal of agroforestry is to increase the diversity, productivity, profitability, and sustainability of a farm. A lot of work has been done over the last century to developed agroforestry as a scientific discipline, with the goal of better quantifying the benefits to farmers in terms of increased crop yields, nourished the soil, and increased profits. Despite the importance of Agroforestry, today tropical forests, more than any other ecosystem, are experiencing habitat alteration and species extinction on a greater scale and at a more rapid pace than at any other time in their history, (Jeremy M.B. Smith, 2023).

However, numerous researchers such as Okunlola, (2010) Oino and Mugure, (2013) and Olumba and Rahji, (2014) have endeavored to utilize various strategies and methods when conducting research on agroforestry adoption in the Nigeria. Agbelemoge and Akinyemi, (2011) saw that factors such as education, financial status, type of agroforestry systems and sources of information on agroforestry developments were answerable for low reception of the practices by the farmers. Bankole, *et al.,(*2012) stated that the degree of agroforestry practices utilized by farmers are controlled by the level of practices the farmers know about or exposed to, Consequently, information about agroforestry ought to be adequately reached out to farmers for better performance.

Jamala, *et al*., (2013) indicated that absence of information and absence of planting materials affected the adoption of agro-forestry service more than the afore mentioned variables. Even while there is mounting evidence from previous studies that Nigeria should increase its incorporation of trees into agricultural systems, there is still little observable information on the effect of agroforestry on profitability.

Study along these lines is expected to assess the perception of arable crops farmers in selected Local Government Areas of Ekiti State towards agroforetry practices and broaden the existing knowledge, so as to address these gaps in the current literature on agroforestry in the country and provide further

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information on the causal mechanism undermining the adoption of agroforestry technologies among arable crop farmers at large.

METHODOLOGY

Study Area

The study was carried out in Ekiti State, Nigeria. The state consists of 16 Local government areas. The state is located on longitudes 4° 45^0 and 5° 45^0 East of the Greenwich meridian and latitudes 7° 15^0 and 8° 15° North of the equator. Ekiti State is bounded in the North by Kwara State; South by Ondo State; West by Osun State and in the East by Kogi State.

Ekiti state is located in the Tropical rain forest region. Topographically, the state is mainly an upland area with over 250 meters above sea level (Ekiti State Government, 2008). The 2006 National population census affirmed the population of Ekiti State to be 2,384,212 people.(NPC, 2006). Food crops such as yam, cassava and also grains (rice and maize) are grown in large quantities. Ekiti land is also known for its forest resources and notably timbers, because of the favourable climatic conditions. Other notable cash crops such as kola nut and varieties of fruits and timber trees are also cultivated in commercial quantities. (Ekiti State Ministry of Agriculture and Food Security 2019).

Sampling procedure and sampling size

The study employed the multi-stage and proportionate sampling procedure in the selection of respondents. The first stage was the purposive selection of four (4) Local government areas (LGAs) from the ADP Zones in the State. The second stage involved a random selection of three communities from each of the Local Government Areas to make twelve (12). The third stage involved a random and proportional selection of arable crops farmers from each of the villages using the ADP registered farmers record to make 240 respondents.

Data Analysis

Descriptive statistics such as frequencies and percentages were used to analyze the socio-economic characteristics of the respondents, while Likert scale was used to determined relationship where demographic variables were assessed at the nominal level based on the perceptions of arable crop farmers on agroforestry practices.

RESULTS AND DISCUSSION

Frequency distribution of the respondents according to their Socio-Economic characteristics

In Table 1 below, it is shown that 14.6% of the respondents were within 21-30 years age bracket, while (35.8%) of the respondents were within the ages bracket of 31-40 years, about 27.1% of the respondents are between 41-50 years of age, 15.0% of the respondents had age grade of 51-60 years and the retirement age of 60 years above had a percentage of 7.5%,. The average age of the respondents is 46± S.D years. This is similar to the mean age (41.62 years) of farmers recorded by Umunna *et al.,* 2018 in Igabi Local Government Area of Kaduna State. This result indicated that the selected arable crop farmers in the study area are within economically active age range, therefore, they can adopt agroforestry technologies and could also increase food security in the country more than any other age group.

The result further indicates that (62.9%) of the respondents were male while the remaining (37.1%) were female, which implies that farming in the study area was dominated by men, this corroborated with the findings of Akinnusi,et al., (2018); Asadu,et al., (2018), that male respondents dominated farming operations. It is also shows that majority of the respondents (59.2%) were married, the singles

were 27.1%, while divorced and widowed were 6.7% and 7.1% respectively. Onwubuya and Ajani (2012) affirmed that married farmers dominate agricultural production in Nigeria, also from the result respondents are responsible for household welfare and needs, due to more obligations accrued through marriage, hence they tend to involved in various activities such as agroforestry, aside from crops farming (Sichone and Kwenye, 2018).

Majority (93.0%) of the respondents had formal education, while 6.70% of them had no formal education, this agrees with the finding of Nwaru and Onuoha (2010) that a greater percentage of smallholder food crop farmers in Imo state are educated, this implies that majority of the respondents were literate, therefore the ability of the majority of the farmers to read is expected to have positive influence on their willingness and capacity towards adopting agroforestry practices, (USAID, 2010).

Christianity was found to be the dominant religion (72.9%) among the respondents in the study area, while lslam and Traditional religion constituted (22.1%) and (5.0%) respectfully, this implies that the church could be the most likely social institution for the dissemination of agroforestry information to ensure adequate adoption of the technologies, this agree with Conley and Udry (2001) who stated that farmers who cannot access information from external sources can presumably draw knowledge within their social networks and transfer technology information through social interactions.

It was shown that (51.7%), (30.80%), (14.20%), (3.30%) of the respondents had household size of 6-10, 1-5, 11- 15, 16 persons and above respectively, The average household size as estimated was 6.5 (about 6 persons), this result agrees with the finding of Otitoju and Arene (2010) that majority of the respondents (medium-scale soybean farmers in Benue State Nigeria) had the average household size of about 7 people, also (52.50%) of the respondents had farming as their primary occupation, while 67.10% had farming as their secondary occupation, others secondary occupation like civil servants, trading and artisans were reported to be 3.30%, 20.40% and 9.20% respectively. This finding suggests that majority of the sampled respondents practice agroforestry.

It is shown that only 60% of respondents are members of a farmers' or agroforestry cooperative society, suggesting that such membership may influence the respondents' choice to participate in agroforestry activity. On extension contact, 1.7% of respondents never had any contact with extension agents, 34.60 % had monthly contact (Fortnightly), 25.4 % had contact with extension agent every two to five months, 19.2 % had contact with extension agent every six to ten months, and 19.2 % had contact with the extension agents every ten months or more. It has been shown that agroforestry farmers who have regular contact with extension agents and services are more dedicated to their work, make more efficient use of limited resources, and have greater financial success as a result of their agroforestry practices.

Table 1 : Frequency distribution of the respondents according to their Socio-Economic characteristics.

Socio – Economic Variables	Frequency (n=240)	Percentage (%)
Age (years)		
21-30	35	14.6
31-40	86	35.8

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41-50	65	27.1
51-60	36	15.0
>60	18	7.50
Gender		
Male	151	62.9
Female	89	37.1
Marital Status		
Single	65	27.1
Married	142	59.2
Divorced	16	6.70
Widowed	17	7.10
Educational Background		
No formal Education	16	6.70
Adult literacy	24	10.0
Primary Education	18	7.50
Secondary Education	126	52.5
Tertiary Education	56	23.0
Religion		
Christianity	175	72.9
Islam	53	22.1
Traditional	12	5.00
Household size		
1-5	124	51.7
6-10	74	30.8
11-15	34	14.2
>16	8	3.30
Primary Occupation		
Farming	126	52.5
Civil Servant	82.0	34.2
Trading	31.0	12.9
Artisan	0.01	0.40
Cooperative Association		
Yes	144	60.0
No	96.0	40.0
Extension Contact		
None	4,00	1.70
Monthly	83.0	34.6
2-5 months	61.0	25.4
6-10 months	46.0	19.2
10 Months Above	46.0	19.2

Labour and other Farm related characteristics

From Table 2 below hired labour (38.8%), was found to be the main source of labour for farming in the study area, followed by self (29.6%), without any assistance, the study also indicated that 28.3% used family labour, whiles 3.3% of the respondents used communal labour. The study indicated that farmers who used family labour were few.

This affirmed the report of (FAO 2019), that farmers whose main source of income is agriculture might be discouraged from allocating family labour for agroforestry activities.

Majority (62.5%) of the respondents were land owners base on inheritance (35.0%), purchased (22.5%) and gift (5.0%) respectively, that is they own the farm land, while 24.6% rented their lands, 6.7% were on leased, 3.3% cultivate on community land while 2.9% depends on Government land. This implies that respondents in the study area were land secured. It is assumed that land security has the tendency of influencing farmers' willingness to involve in agroforestry practices in the study area, this conclusion corroborated with the results of Amusa and Simonyan, (2018), who found that 82.0% of farmers held their agricultural land outright (through inheritance, gift, purchase, or community ownership), whereas 18.0% rented or leased theirs.

The analysis from table 2 shown that (49.6%) of the respondents cultivated less than 1 ha, 41.70% had farm sizes ranging from 1-3 ha, and 8.80% of the respondents cultivated 3-4 ha of land. The mean farm size of the respondents was 1.5 ha. Akinwalere, (2017), reported a mean farm size of 2.7 hectares for farmers in Southwest, Nigeria, which is an indication that majority of the farmers were small – scale farmers. As shown in Table 2, (27.1%) of the farmers had 1-10 years experience, 48.8% had 11-20 years, and 16.3% had 21-30 years of farming experience while the average farming experience was about 14 years.

This shows that appreciable proportions of the farmers were quite knowledgeable in farming and can easily perceive new innovation. This could be a function of number of years the farmers had been in farming. It is expected that the years of farming experience should influence the level of adoption of agroforestry practices in the study area. (Ogundele and Okoruwa, 2006).

Table 2 : Labour and other Farm related characteristics

Socio – Economic Variables	Frequency (n=240)	Percentage (%)
Labour Type		
Self	71.0	29.6
Family	68.0	28.3
Hired	93.0	38.8
Communal	08.0	3.30
Source of Land		
Purchased	4.0	22.5
Rented	59.0	24.6
Leased	16.0	6.70
Inherited	84.0	35.0
Communal	8.00	3.30
Government	7.00	2.90
Gifted	12.0	5.00
Farm Size		
<1 Ha	119	49.6
1 - 2.99 Ha	100	41.7
3 - 4.99 ha	21.0	8.80
Years of Farming Experience		
1 – 10	65.0	27.1
11 – 20	117	48.8

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21 – 30	39.0	16.3
≥ 31	19.0	7.90

Perceptions of farmer towards agroforestry practices in the study area

The perceptions in the study area about agroforestry practices was either positive and negative perceptions, the first one entails the knowledge on agroforestry practices from practical experiences, such perceptions are still pure from emotions, opinions and dissatisfactions. the second level of perceptions is more of perceived benefits, risks and barriers related to agroforestry, the two levels of perceptions enable farmers to construct perceptions through feelings, emotions, and further opinions. From this study, it is observed that those favourable and positive perceptions of the farmers to adoption of agroforestry practice are important to achieve increased agricultural productivity while the negative statement that farmers disagree with indicate that farmers are not willing to involve in agroforestry.

The results from table 3 shows that majority of the respondents were opined that returns from trees and crops put more money into farmers' pocket to improve standard of living (mean= 3.90), trees, crops, animals provide food, timber fuel wood, fodder, hides, medicines for human benefits/uses (mean= 3.68), leguminous trees/shrubs promote yield of crops and increase farmers' income (mean= 3.57), trees provide shade and protection against windbreaks (mean= 3.55), animals dung serve as manure to crops (mean= 3.53), leguminous trees improve soil fertility (mean= 3.52), trees prevent soil erosion (mean= 3.50). Also agroforestry practice takes lot of time to practice (mean= 3.23), agroforestry practice is not costly to adopt (mean= 3.22), inputs required for agroforestry practice are easily available (mean= 3.18) , agroforestry practice is culturally compatible (mean= 3.16), agroforestry practice has helped to increase cultivated hecterage (mean= 3.15}, land ownership pattern affects adoption agroforestry (mean= 3.13), agroforestry practice has high labour requirement (mean= 3.10), agroforestry practice is very complex to understand (mean= 2.98), trees hinder the growth and yield of agronomic crops (mean= 2.73).

Therefore from the results, the perception of the arable crops farmers on agroforestry practice in the study area varied, this agrees with Ajayi, *et al.*, 2012 who noted that farmers' perception of new technologies varies greatly in South- western Nigeria. Majority of the respondents in the study area are aware of the positive impact of agroforestry practices. The respondents were aware of the economic and environmental benefits of agroforestry practices and had favourable attitude towards those practices. It may be due to the fact that a significant proportion of the respondents were literate in the study area. Most of the respondents know that agro-forestry practices increases productivity although difficult to practice.

Table 3 : Perceptions of farmer towards agroforestry practices in the study area

Variables	SD	D	U	A	SA	Mean
Trees and Crops improved farmers standard of living.	5.00	9.20	12.1	37.9	35.8	3.90
Trees, Crops and Animals provides foods and other products for human benefits and used,	9.20	9.20	15.8	36.7	29.2	3.68

Leguminous trees increases crops yield	8.80	12.1	16,7	38.3	24.2	3.57
Trees provide shade and protection	9.20	14.6	12.5	40.0	23.8	3.55
Animal dung served as manure to crops	9.20	12.9	13.3	45.0	19.6	3.53
Leguminous trees improved soil fertility	7.50	18.3	15.0	33.3	25.8	3.52
Trees prevent soil erosion	12.1	10.8	15.8	37.1	24.2	3.50
Agroforestry takes a lot of time to practice	12.5	19.2	19.6	30.8	17.9	3.23
Agroforestry is not costly to adopt	14.2	19.6	18.8	25.0	22.5	3.22
Agroforestry inputs are readily available	12.5	21.3	20.4	27.1	18.8	3.18
Agroforestry is culturally compatible	17.9	18.3	16.3	25.0	22.5	3.16
Agroforestry helped to increase hectarage of land	12.9	24.6	14.6	30.0	17.9	3.15
Land ownership patterns affect agroforestry adoption	9.20	30.8	16.7	24.2	19.2	3.13
Agroforestry is highly labour intensive	14.6	21.3	20.4	27.5	16.3	3.10
Agroforestry is very complex to practice	16.3	20.8	23.8	27.1	12.1	2.98
Trees hinders growth and yields of agronomic crops	32.1	19.6	3.80	32.9	11.7	2.73

Mean Score = 3.00

Aggregate farmer perceptions towards agroforestry practices in the study area

Total farmer perception on agroforestry in the study area is summarized in Table 4. The results showed that while 67.9% of respondents said that agroforestry practices were favourable and beneficial to them, 32.1% said the opposite. This means that the majority of farmers in the study area agreed that agroforestry practices was perceived to be favourable to their farm operations.

Table 4: Aggregate farmer perceptions towards agroforestry practices in the study area

Perception Statement	Favourable	Favourable
Agroforestry practices by farmers	163 (67.9)	77 (32.1)

Constraints to perception of arable crop farmers in agroforestry practices.

From data presented in Table 5, the major constraints to perception of arable crop farmers in agroforestry practices in the study area were fire outbreak (mean=3.19), Non-availability of seeds/seedlings (mean=2.81), Poor extension service (mean=2.67). The above results corroborated the report of Ibrahim *et al.,* (2018) in assessment of Agroforestry practices in Kaiama Local Government Area of Kwara State, time consuming (mean=2.65), was ranked fourth, while other constraints includes pest/rodents and diseases (mean=2.64), land tenure system (mean=2.60), labour intensive (mean=2.55), lack of technical know-how (mean=2.54), which could result to poor yield, low quality/market value and poor return to households (Mabel, 2015), this study aligned with the study of Amusa and Simonyan, (2018), that identified inadequate extension service, poor technical know – how, low income, capital intensive nature of agroforestry, land tenure system, insufficient knowledge about source of credit and high cost of inputs required for tree planting as challenges influencing farmers willingness to engaged in agroforestry practices in Southwest, Nigeria.

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The respondents perceived that the minor constraints to agroforestry were; not profitable (mean=2.24), not meant for low income farmers (mean=2.34), unfavourable weather condition (mean=2.35), tree casting shadow on crops (mean=2.41), small land holding (mean=2.45), is equally a constraint to adoption of agroforestry practices because majority of the farmers were on rented or lease farmland and they cannot used such land for agroforestry practices. Suman,et al., (2018), noted that tenant farmers and squatters find it difficult to plant trees on their farm land due to tenured restrictions.

Table 5 : Constraints to perception of arable crop farmers on agroforestry practices.

Items	NS	SS	MS	HS	Mean Score	Rank
Fire outbreak	51.3	29.2	7.1	12.5	3.19	I
Non-availability of seeds/seedlings	27.5	39.2	20.0	13.3	2.81	2
Poor extension service	17.1	44.6	26.3	12.1	2.67	3
Pest /rodents and diseases	22.1	34.6	28.3	15.0	2.64	4
Time consuming	23.3	33.3	28.3	15.0	2.65	5
Land tenure system	25.4	23.8	35.8	15.0	2.60	6
Long gestation period	21.3	32.9	29.6	16.3	2.59	7
Not properly understood because of its technicality	30.0	18.3	31.7	20.0	2.58	8
Lack of incentives	21.3	34.2	22.9	20.7	2.55	9
Labour intensive	23.3	24.6	36.3	15.8	2.55	9
Lack of technical know-how	22.9	28.3	28.8	20.0	2.54	11
Expensive to practice	19.2	27.5	35.8	17.5	2.48	12
Can not be practice on small piece of land	21.3	27.9	28.8	22.1	2.48	12
Hinders the use of modern farm technology	18.3	29.2	35.0	17.5	2.48	12
Small land holding	18.8	26.3	36.7	18.3	2,45	15
Tree casting shadow on crops	18.3	25.0	36.3	20.4	2.41	16
Unfavourable weather condition	20.0	22.5	30.0	27.5	2.35	17
Not meant for low income farmers	18.3	26.3	26.3	29.2	2.34	18
Not profitable	19.2	19.2	27.9	33.8	2.24	19

Aggregate Constraints faced by Farmers

The result showed that majority 62.1% of the arable crop farmers perceived that there are some constraints hindering their adoption of agroforestry, while 37.9% perceived it as no constraints.

Table 6 : Aggregate Constraints to involvement of arable crop farmers in agroforestry practices.

Constraints	Frequency	Percentages (%)
Not constrained	91	37.9
Constrained	149	62.1

CONCLUSION AND RECOMMENDATIONS

It was found that the main reason why farmers practiced agroforestry in the study area was the provision of income, forest products such as timber, fuel wood, medicinal products and poles, likewise, some of the farmers practiced agroforestry for soil enrichment/nutrient, soil and water conservation and environmental purpose, therefore, most arable farmers in the study area perceived agroforestry practice to be favourable to them.

As affirmed from this study, farmers should provide adequate measures to prevent and control fire outbreak, enlightenment of farmers by extension agents should be prioritized since their level of education determines the rate of adoption of agroforestry, also, land ownership has the potential to influence farmers' decision on agroforestry practices, therefore, promulgations on land use should be farmers' friendly, other technical supports such as viable seed/seedlings, credit facilities and incentives must be made available and subsidized by government, agencies and private organizations.

REFERENCES

Adeola, A.O. (2015). Principles and practice of Agroforesrty.Yempet Publishers, Akure 150p.

Agbelemoge, A. and Akinyemi O. (2011). Diffusion of agroforestry innovations in Odeda local government area of Ogun State, Nigeria: Implications for Extension Services, *Continental Journal of Agricultural Economics,* 5(2):40–47.

Ajayi, O.O., Ugege, B.H.,Gbadebo, O.V., and Adegbayi, O.R. (2019).Awareness and adoption of agroforestry technologies among Cocoa Farmers in Ekiti state, Nigeria. FUOYE Journal of Agiculture and Human Ecology, 3(2):13-22.

Akinnusi, F. A., Sodiya, C. and Adamu, C. (2018). Determinants of farm hygiene practices towards preventing and controlling poultry diseases among poultry farmers in Lagos State, Nigeria. *Journal of Agricultural Extension,* 22(2), 13-27. doi.org/10.4314/jae.v22i2.2.

Akinwalere, B.O.(2017). Determinants of adoption of agroforestry practices among farmers in Southwest Nigeria. *Applied Tropical Agriculture Journal*,Volume 22, No. 2, 67-72.

Amusa T.A. and Simonyan J.B. (2018), Discrete choice model of farmers' willingness-to-engage in agroforestry-based farming in Southwest, Nigeria. *American Journal of Earth and Environmental Sciences.*;1(2):41-49.

Asadu, A. N., Ozioko, R. I., and Dimelu, M. U. (2018). Climate change information source and indigenous adaptation strategies of cucumber farmers in Enugu State, Nigeria. *Journal of Agricultural Extension*,22(2):136-146.doi.org/10.4314/jae.v22i2.12.

Bankole, A. S., A. E. Adekoya and Nwawe C. N. (2012). Women's Awareness and Utilization of Agroforestry Practices in Oluyole Local Government Area of Oyo State, Nigeria. *International Journal of Agricultural Economics & Rural Development,5*(1): 95-103.

Conley, Timothy, and Udry Christopher. (2001) "Social learning through networks: The adoption of new agricultural technologies in Ghana." *American Journal of Agricultural Economics*.83.3:668-673.

Ekiti State Government (2008). Ekiti State Government Diary 2008. Ekiti State Government, Ado-Ekiti, Nigeria. Ekiti State Ministry of Agriculture and Food Security 2019.

FAO, 2019. Food and Agriculture Organization of the United Nations, Rome, Italy, http://www.fao.org/ faostat/en/#data.

Ibrahim, A. O., Adeniji, O. A, Ampitan, T. A., Ogialekhe, P., Adegbola, G A. And Buochuana, A. (2018). Assessment of Agroforestry Practices in Kaiama Local Government Area of Kwara State. *Proceedings of the 6th Biennial National Conference of the Forests and Forest Products Society* (FFPS),pp100-110.

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Ibrahim, A. O., Adedeji, A. S. and Meduna, P. N.(2019). Constraints Facing Agroforestry Practices among Farmers in New Bussa, Nigeria, *Journal of Research in Forestry, Wildlife & Environment.*Vol.11(3):*pp. 133-141*.http://www.ajol.info/index.php/jrfwe.

Jamala, G. Y., Shehu, H. E., Yidau, J. J., & Joel, L. (2013). Factors Influencing Adoption of Agro-Forestry among Smallholder Farmers in Toungo, Southeastern, Adamawa State, *Nigeria. IOSR Journal of Environmental Science, Toxicology And Food Technology* (IOSR-JESTFT). Volume 6, Issue6, PP.66-72. www.iosr journals.org.

Jeremy M.B. Smith, (2023), Animals and Nature "tropical rainforest". *Encyclopedia Britannica*, https://www. britannica.com/science/tropical-rainforest.

Leakey RRB, (2022), Future of Food in African, A commentary to highlight the publication of a review paper on the Third Decade of the Domestication of indigenous food trees as new crops for African agriculture. *African Journal of Food Agriculture Nutrition and Development* 22(3):1-75.

Mabel, U. D. (2015). Involvement of Farm Households in Banana and Plantain Production in Aguata Agricultural zone of Anambra State, Nigeria. *Journal of Agricultural Extension*. 19 (1),107-121.

National Population Commission (NPC)(2006) Nigeria National Census: Population Distribution by Sex, State, LGAs and Senatorial District: 2006 Census Priority Tables (Vol. 3). http://www.population.gov.ng/index.php/publication/140-popn-distri-by-sex-state-jgas-and-senatorial-distr-2006.

Nwaru, J.C. and Onuoha, R.E., (2010). Credit Use and Technical Change in Smallholder Food Crop Production in Imo State of Nigeria, *New York Science Journal* 3(11), 144-152.

Oino, P. and Mugure, A. (2013).Farmer-Oriented Factors that Influence Adoption of Agroforestry Practices in Kenya: Experiences from Nambale District, Busia County *International Journal of Science and Research (IJSR),* 2(4), 2319-7064.

Okunlola J. O. (2010). Factors Influencing Adoption of Rubber-Based Techniques among Small Holder Farmers in Delta State, Nigeria, *Journal of Food, Agriculture & Environment* 8(2): 391-394.

Olumba, C. C. and Rahji, M. A.Y. (2014). An Analysis of the Determinants of the Adoption of Improved Plantain Technologies in Anambra State, Nigeria, *Journal of Agriculture and Sustainability.* 5(2):232-245.

Ogundele, O. O. and Okoruwa, V. O. (2006). Technical efficiency differentials in rice production technologies in Nigeria Nigerian Institute of Social and Economic Research University of Ibadan/AERC Research Paper 154 *African Economic Research Consortium*, Nairobi.

Onwubuya EA, Ajani EN (2012).Strategies for improving production and processing of cocoyam among women farmers in Anambra State, Nigeria. *Universal Journal of Education and General Studies. 1.* 1(1):1-5.

Otitoju M. A. (2010): "Constraints and determinants of technical efficiency in medium-scale soybean production in Benue State, Nigeria." *African Journal of Agricultural Research* 5.17: 2276-2280.

Parihaar R. S, Bargali K, and Bargali S. S., (2015). Status of an indigenous

agroforestry system: a case study in KumaunHimalaya, India. *The Indian Journal of Agricultural Sciences* 85(3):442-447.

Place F , Torquebiau E F, Malézieux E, Iiyama M , Sileshi G W , Kehlenbeck K , Masters E, Weber J C , Dawson I A K, Jamnadass R H , McMullin S. (2022). The benefits of agroforestry systems for food and nutritional security. CIFOR-ICRAF. https://www.worldagroforestry.org/publication/benefits-agroforestry-systems-food-and-nutritional-security.

Prabhu, R., Barrios, E., Bayala, J., Diby, L., Donovan, J., Gyau, A., Graudal, L., Jamnadass, R., Kahia, J., Kehlenbeck, K., Kindt, R., Kouame, C., McMullin, S., vanNoordwijk, M., Shepherd, K., Sinclair, F., Vaast, P., Vågen, T.G. and J. Xu,(2015):Agroforestry: Realizing the promise of an agroecological approach. – In: Food and Agriculture Organization of the United Nations (FAO): Agroecology for Food Security and Nutrition: Proceedings of the FAO International Symposium. – Rome.

Sabastian, G.E., Yumn, A., Roshetko, J.M., Manalu, P., Martini, E., Perdana, A. (2019). Adoption of silvicultural practices in smallholder timber and NTFPs production systems in Indonesia. *Agroforestry Systems*, 93 (2): 607-620, https://doi.org/10.1007/s10457-017-0155-9.

Sichone Trevor, Kwenye J.M (2018). Rural youth participation in agriculture in Zambia. *Journal of Agricultural Extension.* 22(2):51-60.

Suman, S., Arifa, S., Rahul, B. and Ashaduzzaman, Md. (2018). Farmers' Perception and Adoption of Agroforestry Practices in Faridpur District of Bangladesh. *International Journal of Environment, Agriculture and Biotechnology (IJEAB)* Vol-3,Issue-6,pp.1987-1994,doi:10.22161/ijeab/3.6.5.

Umunna, M. O ., Adeeko, A., Adigun, S.O., Adebayo, O.A and Awoleke, O.K.(2018) training needs on aquaculture value addition among fish farmers in Brgu local government area, Niger state, Nigeria, *Journal of Research in Forestry, Wildlife & Environment* Vol. 11(4):2141–1778.

United States Agency for International Development (USAID) 2010. ICT to enhance farm extension services in Africa. FACET briefing paper, Washington DC.;35.1-3.