Applied Tropical Agriculture
Volume 24, No 1, 162-169, 2019
© A publication of the School of Agriculture and Agricultural Technology, The Federal University of Technology, Akure, Nigeria

AWARENESS OF EXTENSION PROFESSIONALS ON AGRO-METEOROLOGICAL SERVICES IN ONDO STATE, NIGERIA.

[1]Pius, T. A. and [2]Akinnagbe, O. M.

[1] Ministry of Agricultural and Rural Development, Ado-Ekiti, Nigeria
[2]Department of Agricultural Extension and Communication Technology, Federal University of Technology, Akure, Nigeria
[*]Correspondence author: femtad4real@yahoo.com

Abstract

This study ascertained the awareness of extension professionals on agro-meteorological information in three agro-climatological zones of Ondo State, Nigeria. Simple random sampling technique was used in selecting 112 respondents among the extension staff in the State.Data were analyzed using descriptive statistics and Chi-square.The mean age of the respondents was 43 years while majority of the respondents were male76.8%, married 90.2% and Christians were89.3%.The average household sizes were 4 persons while53.6% of the extension professionals possessed first degree. Majority of the respondents had an average working experience of 12 years. The extension agents (EAs) constituted the largest group of the extension professionals 57.2%. About 84% of the extension professionals utilize information on seasonal rainfall prediction;other agro-meteorological information utilized includes information on daily weather forecast 96.4%and occurrence of pest and diseases72.2%. Working experience had significant association with utilization of all the agro-metrological information. This study showed that extension professionals should ensure timely delivery of agro-meteorological information to farmers so that farmers can use these agro-meteorological information to plan for their next planting season.

Key words: Agriculture, Agro-meteorology, Agro-meteorological Services.

INTRODUCTION

Agriculture is one of the most important sectors of Nigeria economy; it employs about 65% of the labour force in Nigeria and contributes more than 30% of the total annual Gross Domestic Product (GDP) (Tolulopeand Chinonso, 2013). It also provides over 80% of the food need of the country (Eze, 2017). Agricultural production in Nigeria is dependent on weather and climate despite the impressive advances in agricultural technology over the last decades(Akinbile, 2010). Palaniappa (2011) noted that farming, including crop and pastureland covers 40% of the globe and accounts for 70% of consumptive water use.It implies that change in weather caused by man or climate will resonate throughout the global environment and economy.The entire agricultural industry is influenced by weather and climate events. It is therefore very important for extension agents to know that there are daily season and annual variations that play vital role in crop response and survival (John, 2014).

Agro-meteorology is the study and use of weather and climate information to enhance or expand agricultural crops and to increase crop production. It took shape as a field of applied science at the end of the nineteenth century, at the beginning of the global effort to apply scientific principles to improving agricultural productivity. Indispensable climatic variables in the development of agricultural meteorology include, more or less, all those pertaining to geographical climatology, especially those that allow interpretation of physical processes in the lowest atmosphere and upper soil layers, which are the climatic determinants for the local or regional biosphere (Monteith and Unsworth, 2007)

Meteorological considerations enter into assessing the performance of plants and animals whose growth is a result of the combined effect of genetic characteristics and their response to the local environment. The weather is a major component of the local environment, which also includes soil properties, terrain, other plants and farming practices. For more than a century, agriculturalmeteorologists have worked to develop tools, techniques, and practices that farmers can use to make agriculture more resilient, (WMO, 2001).Climate change is severely affecting livelihoods in Nigeria by altering seasonal rainfall patterns. Streams and springs

are drying up, causing major crop yield reductions and food shortages. However, the level of awareness of climate change impacts is very low. Corporations and the transport sector, the major perpetrators of this damage, have not even begun to take the necessary actions to address these problems. No abatement measures are being implemented to stop gas flaring, Nigeria's main source of greenhouse gas emissions, (Friends of the Earth, 2007). According to the UNDP (2010), the level of awareness about climate change is rather low in Nigeria, and it is likely to continue if no intervention measures are taken. The survey noted that the awareness of climate change was highest at the federal level. This dropped sharply at the state and local government levels, where real action is needed.

Bad weather may affect the quality of produce during transport and viability and vigor of seeds and planting material during storage, so there is need for extension professional to be aware of agro-meteorological information and how such agro-meteorological information is disseminated by extension professionals. This study therefore investigated the awareness of extension professionals on agro-meteorological information in Ondo State, Nigeria. The study also ascertained the demographic characteristics of the respondents, their level awareness on agro-meteorological information, determine the utilization of agro-meteorological information and determine the challenges in utilization of agro-meteorological information.

METHODOLOGY

The study area

This study was carried out in Ondo State Nigeria. The State was created in 1976 with 28 LGAs.Ondo State lies between latitudes $5^{0}45^{1}$ and $8^{0}15^{1}$ north of the equator and $6^{0}0^{1}$ east of the Greenwich meridian. The State has 18 Local Government Areas (LGAs), a population of 3,441,024 and covered an area of 15,500 km^{2}(National Population Census (NPC), 2006; National Bureau of Statistics (NBS), 2008). It is bounded in the North by Ekiti State in the east by Edo and Delta State in the West by Ogun and Osun State and in the South by the Atlantic Ocean.

Method of data collection

Extension Professionals comprising of project manager, zonal manager, subject matter specialists, block extension supervisors, and extension agents working in Ondo State Agricultural Development Programmes (ADP) constituted the population of the study.ADP has 117 Extension Professionals in the State as at the time of data collection. Out of this population 112 respondentswere randomly selected sampled for the study. A set of well-structured questionnaire was used to collect primary data from the selected extension professionals.

Method of data analyses

Descriptive statistical tools such as frequency table percentage and mean were used to analyze the data. To ascertain the awareness of the respondents on Agro-meteorological services, a list of agro-meteorological information was obtained and each respondent was asked to respond: aware = 1 and not aware = 0.Also utilization of agro-meteorological information was measured by asking the respondents if Used(1) and Not Used(0) and the challenges in utilization of agro-meteorological information was measured using a 3 point Likert scale; Major challenge(2), Minor challenge(1), Not a challenge(0). The mean score of 1 and above was considered as 'major challenge' and belowas'not a challenge'. Chi-square was used to test for the association between the demographic characteristics and utilization of Agro-meteorological information.

RESULT AND DISCUSSION

The results in Table 1revealed that respondents had a mean age of 43.At this mean age,extension professionals are expected to be agile and articulate on the job. Majority of the respondents76.8% were male.This reflects gender imbalance in the recruitment of extension professionals in the state. Table 1 also revealed that the majority 90.2% were married. This implies that most of the respondents were married and as such, have responsibilities. The majority 89.3% were Christians, This means that the presence of various religious faiths (Muslims 9.8% and Traditional 1.8%) among extension professionals implies that there might not be discrimination against utilization of agro-meteorological services. This agreed with the findings of Thomas and Sanyaolu (2017), who reported that there is no discrimination with regards to religious faiths in the recruitment of extension agents in the study area. In addition, 71.4% of the respondents had an average of 4 persons as their household size. This means that the majority of the respondents had large household size and as such, respondent have more responsibilities at home.About54% of the respondents possessed B.Sc/B.Agriculture certificate, 36.6% respondents possessed HND, 7.1% respondents possessed M.Sc and

2.7% respondents possessed OND. The implication of this result is that respondents were qualified for their job and extension delivery.

The majority of the respondents had an average working experience of 12 years. This implies that most of the respondents are well experienced and therefore are more familiar with agro-meteorological information. The Extension agents (EAs) were the largest group of the extension professionals 57.2% while21.4% respondents were Block Extension Agents (BEAs),this could be because of the fact that it is the extension agents are always in contact with the farmers and the bulk of actual information dissemination is entrusted to them.

Table 1: Demographic characteristics of the respondents

Variables	Frequency	Percentage	Mean
Age (Years)			
26-35	15	13.4	
36-45	50	50	43
>46	41	36.6	
Sex			
Male	86	76.8	
Female	26	23.2	
Marital status			
Single	11	9.8	
Married	101	90.2	
Religion			
Christian	100	89.3	
Muslim	10	8.9	
Traditional	2	1.8	
Household Size			
1-3	30	26.8	
4-6	80	71.4	4
7-9	2	1.8	
Educational Level			
OND	3	2.7	
B.Sc/B.Agric	60	53.6	
HND	41	36.6	
M.Sc	8	7.1	
Years of working experience			
1-13	71	63.4	12
14-26	38	33.9	
27-39	3	2.7	
Current position			
ZEO	2	1.8	
SMS	8	7.1	
BES	14	12.5	
BEA	24	21.4	
EA	64	57.2	

Source: Field survey, 2017

Awareness of Agro-meteorological Services:

Results in Table 2 revealed that extension professionals were aware of the following agro-meteorological information: forecast on seasonal rainfall prediction (87.7%), daily weather forecast (75.0%), information on high and low relative humidity (71.4%), information on occurrence of pest and diseases (70.5%) and information on sunshine intensity (70.5%). The awareness of extension professionals of predictions of seasonal rainfall prediction could be attributed to the fact that farmers in the study area majorly demand for and utilize forecast on seasonal rainfall prediction more than any of the other agro-metrological information in the study area. Apataet al. (2009), reported that farmers depend more on seasonal rainfall prediction to plan their yearly farming operations than another weather parameter in Nigeria.

Moreover, the high level of awareness of extension professionals of daily weather forecast could be due to the fact that farmers depend on daily weather information more during planting and harvesting operations to reduce the incidence of loss associated with climate variability. According to Mannavaet al.(2007). Information on high and low relative humidity was found to be agro-metrological information that the respondents are well aware of. This could be attributed to the fact that farmers relied on information on relative humidity more than during post-harvest operations such as drying and storage of crops. This in turn could help to mitigate the adverse impact of climate variability on post-harvest losses of crops.

Table 2: Percentage Distribution of Respondents Awareness of Agro-meteorological Services

Agro-meteorological Information	Aware		Not Aware	
	Frequency	%	Frequency	%
Forecast on seasonal rainfall prediction	87	87.7	23	22.3
Daily weather forecast.	84	75.0	28	25.0
Information on sunshine intensity.	79	70.5	33	29.5
Information on wind direction.	59	52.7	53	47.3
Information on when to expect minimum and maximum temperatures.	76	67.9	36	32.1
Information on occurrence of pests and diseases.	79	70.5	33	29.5
Information on high and low relative humidity.	80	71.4	32	28.6
Information on temperature for crop processing and storage.	75	67.0	37	33.0
Information on extent of water evaporation from the soil.	66	58.9	46	41.1
Information on climate variability.	71	63.4	41	36.6

Utilization of Agro-meteorological Information

Results in Table 3 revealed that, the majority of the respondents were utilizing the information on daily weather forecast and forecast on seasonal rainfall prediction 96.4% and 84.0% respectively.This could be because such agro-metrological information, when accurately and timely disseminated could help in mitigating the adverse effect of climate variability. This corroborated the findings of Sivakumaret al.(2000),. Furthermore, 72.2%, 67.5% and 66.7% of the respondents utilized information on occurrence of pest and diseases, information on high and low relative humidity and information on temperature for crop

processing and storage in that order. This could be because agro-meteorological equipment in agro-meteorological station were functional to give accurate agro-meteorological information so that it could be disseminated to farmers to assist them in planning their farming activities. Less than half (45.5%), (44.0%) and (43.4%) of the respondents utilized information on climate variability, extent of water evaporation from the soil and when to expect minimum and maximum temperatures respectively. This could be because these agro-meteorological information were too technical for the extension professionals to understand or there may be no equipment to collect information on them. This implies that agro-meteorological information are not been fully utilized probably because of the inaccuracy of agro-meteorological information

Table 3: Percentage Distribution of Respondents Based on Utilization of Agro-meteorological Services

Agro-meteorological information	Used		Not used	
	Frequency	%	Frequency	%
Forecast on seasonal rainfall prediction.	73	84.0	14	16.0
Daily weather forecast.	81	96.4	3	3.6
Information on sunshine intensity.	30	38.0	49	62.0
Information on wind direction.	23	39.0	36	61.0
Information on when to expect minimum and maximum temperatures.	33	43.4	43	56.6
Information on occurrence of pests and diseases.	57	72.2	22	27.8
Information on high and low relative humidity.	54	67.5	26	32.5
Information on temperature for crop processing and storage.	50	66.7	25	33.3
Information on extent of water evaporation from the soil.	29	44.0	37	56.0
Information on climate variability.	33	45.5	38	54.5

Source: Field Survey, 2017

Challenges in Utilization of Agro-meteorological Information

Table 4 revealed the major challenges militating against the utilization of agro-meteorological information in the study area. They include high cost of transportation of extension agents to where the farmers are ($\bar{X}$ = 1.73), extension agents has no personal means of transportation to disseminate agro-meteorological information ($\bar{X}$ = 1.70), malfunctioning of weather apparatus ($\bar{X}$ = 1.56), inadequate of extension agents ($\bar{X}$ = 1.53) and high cost of agro-meteorological information ($\bar{X}$ = 1.43). The high cost of transportation of extension agents to where the farmers are is hindering the prompt and adequate dissemination of agro-meteorological information. This corroborated the findings of John (2014), who reported that a key constraint to the dissemination and utilization of agro-meteorological information in Nigerian is poor mobility for the extension agents. The malfunctioning of weather apparatus another major challenge militating against the utilization of agro-meteorological information will lead to the gathering of unreliable weather information. Therefore, inaccurate information being persistently disseminated to the farmers will definitely reduce the use of such agro-meteorological information since the probability of it being inaccurate is very high. However, the fact that there were inadequate extension agents to disseminate agro-meteorological information to farmersispreventingsome farmers, especially those in the rural areas, the access to such information.

Table 4: Challenges in utilization of agro-meteorological information

Challenges	Major challenge	Minor challenge	Not a challenge	Mean
There is no agro -meteorological information to disseminate.	23(20.5)	22(19.7)	67(59.8)	0.40
Usage of agro-meteorological information is time consuming.	54(48.3)	28(25.0)	30(26.7)	1.16*
Agro-meteorological information is too technical to apply.	43(38.4)	34(30.4)	35(31.3)	1.07*
No access to internet facility.	16(14.3)	30(26.7)	66(59.0)	0.41
Inaccurate agro-meteorological information.	64(57.1)	20(17.9)	28(25.0)	1.32*
Unreliable Agro-meteorological information.	58(51.8)	25(22.3)	29(25.9)	1.25*
Language barrier between extension agent and farmers.	41(36.6)	44(39.3)	27(24.1)	1.12*
Malfunctioning of weather apparatus.	76(62.5)	35(31.3)	7(6.3)	1.56*
The required agro -meteorological equipmentare not available.	10(8.9)	25(22.3)	77(68.8)	0.46
Inadequate number of extension agents.	65(58.0)	42(37.5)	5(4.5)	1.53*
Agro-meteorological information is too expensive.	51(45.5)	59(52.7)	2(1.8)	1.43*
Extension agents are not mobile.	83(74.1)	23(20.5)	6(5.4)	1.70*
High cost of transportation of extension agents to where farmers are.	85(75.9)	24(21.4)	3(2.7)	1.73*
Farmers are unwilling to attend to extension agents.	44(39.3)	39(34.8)	29(25.9)	1.14*
Agro-meteorological information is timely.	57(50.9)	32(28.6)	23(20.5)	1.30*
Lack of corporation among extension agents.	20(17.8)	24(21.4)	86(60.7)	0.60

Figure in parentheses represent percentage (%)
*significant

Association between the demographic characteristics and utilization of Agro-meteorological information.

The results of the association between the demographic characteristics and utilization of Agro-meteorological information in the study area with Chi-square test is presented in Table 5. It was revealed that year of working experience (x^2 = 0.023; $p \leq 0.05$) had a significant association with the utilization of agro-metrological information. This implies that an increase

in the yearsof work experience will lead to an increase in the utilization agro-metrological information.

The result further revealed that sex (x^2 =0.641; p ≥0.05), marital status (x^2 =1.881; p ≥0.05), religion (x^2 =2.821; p ≥0.05) and current position (x^2 = 4.528; p ≥0.05) were not significantly associated with utilization of agro-meteorological information.This means that sex, marital status, religion and current position of the respondents have nothing to do with the dissemination of agro-meteorological information to farmers. This is because the extension professionals are believed to have necessary agro-meteorological information so their demographic characteristics could not influence agro-meteorological information dissemination. It was therefore concluded that working experience is significantly associated with the utilization of agro-metrological information in the study area.

Table 5: Association between Socio-economic Characteristics and their Utilization of Agro-meteorological information

Variables	X^2	df	sig	Decision
Sex	0.641	1	0.423	NS
Marital status	1.881	1	0.170	NS
Religions	2.821	2	0.093	NS
Years of working experience	0.023	2	0.002	S
Current position	4.528	4	0.339	NS

Significant at ≤0.05 (NS = Not Significant, S= Significant)

Conclusion and recommendation

Based on the empirical findings of this study, it could be concluded that extension professionals were aware of agro-meteorological information but did not fully utilize these information due to some challenges. Therefore; extension professionals should ensure timely delivery of agro-meteorological information to farmers so that farmers can use these agro-meteorological information to plan for their planting season. This could be enhanced by government providing motorcycle for extension agents to ease the mobility within the rural areas for extension delivery.

REFERENCES

Apata, T.G., Samuel, K.D. and Adeola, A.O. (2009).Analysis of Climate Change Perception and Adaptation among Arable Food Crop Farmers in South Western Nigeria.Contributed Paper prepared for presentation at the International Association of Agricultural Economists' 2009 Conference, Beijing, China, August 16-22,209

Eze, O.M. (2017). Agricultural Sector Performance and Nigeria's Economic

Growth.Asian Journal of Agricultural Extension, Economics and Sociology. 15(1): 1-13, 2017.

Friends of the Earth International (2007). Nigeria: raising awareness of climate change Impacts. http://www.foei.org/en/resources/publications/annual-report/2007/what-we-achieved-in 2007/member-group-victories/africa/raising-awareness-of-climate-change-impacts.

Mannava V., SivakumarK. and Motha, R (2007). Managing Weather and Climate Risks in Agriculture. Agricultural Meteorology 60: 525-528.

Monteith, J.L., andUnsworth, M.H. (2007).Principles of Environmental Physics. Third edition. London, Edward Arnold.

Palaniappa, K. (2011). Environmental Impact of Food Production and Consumption. Encyclopedia of Life Support Systems (EOLSS).

Sivakumar, M.V.K., Gommes, R. and Baier, W. (2000).Agrometeorology and sustainable agriculture. Agricultural and Forest Meteorology 103, 11–26.

Thomas, K. A. and Sanyaolu, A. S. (2017).Utilization of Agro-meteorological Services among Arable Crop Farmers in Oyo State, Nigeria. Journal of Agricultural Extension, 21 (1).

Tolulope,O. and Chinonso,E. (2013).Contribution of Agriculture to Economic Growth in Nigeria. The 18th Annual Conference of the African Econometric Society (AES) Accra, Ghana at

the session organized by the Association for the Advancement of African Women Economists (AAAWE), 22nd and 23rd July, 2013.

UNDP Project Report (2010) Climate change awareness and adaptation in the Obudu plateau, Cross River State http://aradin.org/modules/AMS/article.php?storyid=11 University of Nigeria,Nsukka.http://www.futminna.edu.ng/index.php?option=com_content&view=article&id=210&Itemid= 208 USAID, (2012). Workshop on "Scaling up climate services for farmers in Africa and South Asia" 10-12 December, 2012

World Meteorological Organization, (2001): Lecture Notes for Training Agricultural Meteorological Personnel (J.Wieringa and J. Lomas-(Editors) (WMO-NO. 551), Geneva