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Utilisation of Agroclimatological Information among Crop Farmers in Ogun State, Nigeria

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Abstract
Agroclimatological information is central to farm-level decision-making under climate variability, yet its practical use by Nigerian farmers remains poorly documented. This study examined the perception, sources, utilisation and constraints associated with agroclimatological information among crop, poultry and fish farmers in Ogun State, Nigeria. Two of the four Ogun State Agricultural Development Programme (OGADEP) zones (Ilaro and Ijebu-Ode) were purposively selected, and 30% of registered farmers across their ten extension blocks were proportionately sampled, making a total of 212 respondents. Data were collected with a validated, interviewer-administered questionnaire and analysed using descriptive statistics and the independent-samples t-test at the 0.05 level. Respondents were predominantly male (72.2%), married (72.6%), aged 40–49 years (49.5%), with secondary education (44.3%) and mixed-farming enterprises (36.9%). Respondents mostly perceived rainfall forecasts for planting decisions (3.18) as relevant and useful agroclimatological information. Radio (3.20), OGADEP (3.13) and extension agents (3.08) were the leading information sources. Most Farmers utilised and concentrated on water-shortage preparedness (3.36) and heat-stress reduction (3.30). Insufficient technical infrastructure (3.20) and socio-economic disadvantage (3.10) were the most severe constraints. The study concludes that education aids practical use, and recommends radio-based awareness campaigns, capacity-building, rural communication infrastructure and localised advisories.

Keywords: Agroclimatological information; Utilisation; Crop Farmers.

1. Introduction

Climate variability and change are among the most serious threats to agricultural productivity and food security worldwide. Rising temperatures, erratic rainfall and more frequent extreme events are undermining crop, livestock and aquaculture systems, with the heaviest burden falling on agriculture-dependent developing economies (Intergovernmental Panel on Climate Change (IPCC), 2022; Saleem et al., 2024). Environmental stress, heat and drought are increasingly recognised as key constraints on crop productivity and, by extension, global food security (Janni et al., 2024). In this context, agroclimatological information, which encompasses weather forecasts, seasonal climate predictions, and early warnings on rainfall, temperature and extreme events, has become an essential resource for helping farmers time planting and harvesting, select appropriate crop varieties, plan irrigation and fertiliser application, and anticipate climate-related risks (Akano et al., 2023). A recent global synthesis of adaptation research identifies timely access to climate information as one of the most consistently reported determinants of farmers' adaptive capacity across regions (Abebaw, 2025).

In Nigeria, however, the production of climate data by the Nigerian Meteorological Agency (NiMet) and related bodies has not been matched by commensurate gains in farmers' access to, or use of, such information. NiMet issues a Seasonal Climate Prediction annually, yet studies report low farmer confidence in and uptake of these forecasts (Adamu & Sawa, 2021; Edwards & Kniveton, 2019), and the agency itself acknowledged in 2026 that gaps in information generation, coordination and delivery persist (NiMet, 2026). A large-scale study of 1,080 farming households across six Nigerian agroecological zones found that although most farmers correctly associate practices such as deforestation and bush burning with climate change, this general knowledge does not consistently extend to actionable, farm-level climate information (Madaki et al., 2023). Studies in south-western Nigeria have similarly reported only partial awareness of climate indicators among smallholders, shaped more by agroecological zone, land tenure and social factors than by information availability itself (Akano et al., 2023; Oluwatayo & Ojo, 2016). Ifeanyi-Obi and Nnadi (2014) found that access to climate information, alongside literacy, farm size and extension contact, significantly influenced the intensity with which farmers adopted adaptation measures, while farmers in flood-prone communities of Benue State relied on

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informal and inconsistent channels for climate information despite the presence of formal extension structures (Idoma & Mamman, 2016). A national review of Nigeria's climate mitigation and adaptation landscape identifies weak dissemination of climate information and limited farmer-level awareness as persistent, cross-cutting constraints (Okafor et al., 2024).

Several structural factors help to explain this access-utilisation gap. Poor rural telecommunications and electricity infrastructure, the cost of mobile data and broadcast equipment, low levels of formal education, and the technical framing of meteorological products limit farmers' ability to receive, interpret and act on agroclimatological information (Idoma & Mamman, 2016; Ifeanyi-Obi & Nnadi, 2014). Agricultural extension services, which should bridge meteorological agencies and farming communities, are frequently understaffed and under-resourced. In Ogun State specifically, an assessment of the Ogun State Agricultural Development Programme (OGADEP) found that the training of extension agents, field visits and dry-season production initiatives had not contributed significantly to food security, largely because of narrow coverage, poor logistics and inadequate funding, leaving many farmers with limited contact with extension personnel (Atobatele et al., 2025). Earlier work had also identified substantial professional competency gaps among OGADEP extension agents (Ayansina & Adeogun, 2017). Evidence from south-eastern Nigeria further shows that extension contact alone does not predict adoption of climate-smart practices; rather, the quality and diversity of the information ecosystem, combining face-to-face advisory services with radio, farmer associations and selected digital platforms, matters more (Aduaka et al., 2026). Comparative evidence from Malawi and Ghana confirms that the specific source of climate information is itself a significant predictor of farmers' climate resilience (Amoak et al., 2023).

Ogun State, situated in the rainforest-derived savanna transition of south-western Nigeria, supports a diversified farming economy in which crop, poultry and fish enterprises coexist, often within the same household. Because these enterprises differ in their sensitivity to rainfall, temperature and water availability, their information needs also differ. Yet little empirical evidence exists on how Ogun State farmers become aware of, source and apply agroclimatological information, or on the factors that distinguish users from non-users. This study addressed that gap. Its specific objectives were to: (i) describe the socio-economic characteristics of the respondents; (ii) assess farmers' perception of the relevance and usefulness of agroclimatological information; (iii) identify their sources of such information; (iv) evaluate the extent to which they utilise it in farming practice; and (v) identify the challenges hindering its effective utilisation. A null hypotheses was tested and is as follows:

$H0_1$: There is no significant difference in the utilisation of agroclimatological information between farmers with access to it and those without.

2. Methodology

The study was conducted in Ogun State, south-western Nigeria. The state, created in 1976 with Abeokuta as its capital, lies approximately between latitudes 6°12'N and 7°58'N and longitudes 2°40'E and 4°30'E, sharing borders with Oyo and Osun States to the north, Ondo State to the east, Lagos State to the south and the Republic of Benin to the west. It covers roughly 16,400 km² across 20 Local Government Areas. The climate is tropical with a bimodal rainy season (April–October) and a dry season (November–March), and vegetation grades from tropical rainforest in the south to derived savanna in the north (Awode et al., 2025; Banjo et al., 2025). Agriculture is the dominant rural occupation, with cassava, maize, rice, plantain, cocoa and oil palm as principal crops and substantial poultry and aquaculture sectors. Agricultural extension in the state is coordinated by OGADEP, established in 1986 with headquarters at Idi-Aba, Abeokuta, which divides the state into four agricultural zones (Abeokuta, Ijebu-Ode, Ikenne and Ilaro), each subdivided into extension blocks and cells (Atobatele et al., 2025).

A descriptive survey design was adopted. The population comprised all registered crop farmers in Ogun State. A two-stage sampling procedure was used. Agricultural zones in Ogun State is organised by OGADEP into four zones, namely Abeokuta, Ijebu-Ode, Ikenne and Ilaro. These four zones fall into two broad agro-ecological groups. Abeokuta and Ilaro lie within the derived and wooded savanna belt of the northern and western parts of the state, whereas Ijebu-Ode and Ikenne lie within the rainforest belt of the south and south-east (Banjo et al., 2025). In the first stage, therefore, the four zones were treated as two agro-ecological strata, and one zone was selected from each stratum. Ilaro was selected to represent the savanna stratum and Ijebu-Ode to represent the rainforest stratum, giving 50 per cent coverage of the zones while capturing both agro-ecological conditions under which farming is practised in the state. Selection within each stratum was constrained by accessibility and by the time and resources available for fieldwork. Ilaro zone comprises four extension blocks and Ijebu-Ode zone six, giving ten blocks in total. In the second stage, a uniform sampling fraction of 30 per cent was applied to the OGADEP farmer registers for 2025 in each selected zone. Because the same fraction was applied throughout, the resulting sample is proportionate to the distribution of registered farmers across the two zones. This yielded 104 respondents from Ilaro, which holds 347 registered farmers, and 108 from Ijebu-Ode, which holds 360, giving a total sample of 212 from a sampling frame of 707.

Data were collected using a structured questionnaire administered as an interview schedule to accommodate respondents with low literacy. The instrument had two parts. Part I captured socio-economic characteristics.

Table 1: Socio-economic Characteristics of the Respondents in the Study Area (N=212)

Characteristics	Frequency	Percentage	Mean	SD
Sex				
Male	153	72.2		
Female	59	27.8	1.28	0.45
Age (In years)				
20-29	27	12.7		
30-39	45	21.2		
40-49	105	49.5		
Above 50	35	16.5	41.48	8.92
Level of education				
No formal education	28	13.2		
Primary education	77	36.3		
Secondary education	94	44.3		
Tertiary education	13	6.1	2.43	0.79
Marital status				
Single	14	6.6		
Married	154	72.6		
Divorced	19	9.0		
Widow	25	11.8	2.26	0.75
Farming experience				
Below 5 years	20	9.4		
6-10 years	69	32.5		
11-15 years	88	41.2		
Above 16 years	35	17.9	11.66	4.88
Land size				
1 acres	55	25.9		
2 acres	116	54.7		
Above 3 acres	41	19.3	2.03	0.83
Monthly income (#)				
Less than 50,000	121	57.1		
50,001-75,000	59	27.8		
75,001-100,000	23	10.8		
Above 100,000	9	4.2	₦45,944.10	₦26,471.90
Household size (In Numbers)				
1-3	44	20.8		
4-6	98	46.2		
7-9	49	23.1		
10 and above	21	10.0		

Source: Field survey, 2025

Part II contained four scales: the Agroclimatological Information Questionnaire (with ten awareness items on a four-point scale from "not aware" to "very high extent"); the Sources of Agroclimatological Information Questionnaire (with fourteen channels rated from "not a source" to "very common"); the Agroclimatological Information Utilisation Questionnaire (with fourteen practices rated from "never" to "always"); and the Challenges Confronting the Effective Utilisation of Agroclimatological Information Questionnaire (with nine constraints rated from "not a challenge" to "severe"). Data were analysed using frequency counts, percentages, means and standard deviations to address the research questions. Hypothesis was tested with the independent-samples t-test at the 0.05 level of significance.

3. Results And Discussion

3.1 Socio-economic characteristics of respondents

The results in Table 1 show that respondents were predominantly male (72.2%) and married (72.6%), with a mean age of 41.5 years and almost half (49.5%) aged 40–49. Educational attainment was modest: 44.3% had secondary education and 36.3% primary education, while only 6.1% had tertiary education. Farming experience averaged 11.7 years, most respondents (54.7%) cultivated 2–3 acres, and 57.1% earned ₦50,000 or less per month. Households of four to six persons predominated (46.2%). Mixed farming was the most common enterprise (36.9%), followed by crop-only (24.5%), poultry-only (20.8%) and fish-only (18.9%) farming. Nearly three-quarters (72.2%) reported access to agroclimatological information and 84.5% reported that it was available or highly available to them. This profile of mature, married, moderately educated male farmers operating small, diversified holdings on low incomes is consistent with the demographic composition of smallholder farming households reported across South west Nigeria (Akano et al., 2023). The predominance of mixed enterprises reflects the diversification strategy through which smallholder farmers in the region spread climate-

Table 2: Farmers' Perception of the Relevance and Usefulness of Agroclimatological Information in Ogun State

Agroclimatological Information	Mean	SD
Integrating agroclimatological information into daily farming decisions to reduce risks and improve outcomes.	2.99	0.92
Agroclimatological data is important when planning fertilizer application.	2.80	0.90
Agroclimatological data, such as rainfall forecasts are helpful in making decisions on the best times for planting	3.18	0.85
Weather forecasts and seasonal predictions are sources that provide agroclimatological information	2.52	0.96
Warnings about droughts and heat waves are interpreted and used to protect crops/livestock	2.90	0.93
Agroclimatological information is useful to efficiently manage my irrigation needs	2.84	0.91
Temperature predictions can impact crop growth and pest management in my farming	2.73	0.93
Regular updates on weather conditions are relevant to farming	2.88	0.91
Government and agricultural agencies provide sufficient information about weather and climate to farmers	2.63	0.95
Local extension officers frequently inform farmers about how to use agroclimatological data	2.80	0.90

Source: Field survey, 2025

Table 3: Sources of Agroclimatological Information for Farmers in Ogun State

Sources	Mean	SD	Rank
Twitter	2.22	0.91	13th
ADP	3.13	0.93	2nd
Phone Calls	2.81	0.93	7th
Research Institute	2.98	0.94	5th
Internet	2.34	0.93	12th
Farmers Association	3.03	0.94	4th
Television	2.89	0.92	6th
WhatsApp	2.52	0.94	10th
Newspapers	2.89	0.92	6th
Radio	3.20	0.93	1st
Extension agents	3.08	0.94	3rd
Instagram	2.43	0.94	11th
Instant Messaging (SMS, MMS)	2.73	0.93	8th
Posters/Fliers	2.66	0.95	9th

Source: Field survey, 2025

related production risk.

3.2 Farmers' Perception of the Relevance and Usefulness of Agroclimatological Information

Table 2 shows that farmers rated the practical relevance of agroclimatological information highly across most items, with a grand mean of 2.83. Perceived usefulness was strongest for rainfall forecasts in planting decisions (3.18) and for integrating the information into daily farm decisions (2.99). The lowest rated items were recognition of weather forecasts and seasonal predictions as sources of agroclimatological information (2.52), and the perceived adequacy of information provided by government and agricultural agencies (2.63). This pattern is instructive. Farmers value the information for the decisions it supports, yet they are considerably less likely to recognise formal seasonal prediction products as the source of that information. This mirrors Madaki et al. (2023), whose national survey found that Nigerian farmers' general climate knowledge is not reliably matched by knowledge of formal, farm level climate products. It also aligns with Oluwatayo and Ojo (2016) and Akano et al. (2023), who reported that farmers in Southwest Nigeria recognise climate change but show uneven familiarity with the specific information services that could support adaptation. The finding suggests that the constraint lies less in farmers' appreciation of the value of climate information, and more in their familiarity with the formal channels through which reliable information is produced and disseminated.

3.3 Sources of agroclimatological information

In Table 3, results show that Radio (3.20), OGADEP (3.13), extension agents (3.08), farmers' associations (3.03) and research institutes (2.98) were the dominant sources. Broadcast and institutional channels therefore continue to outweigh social-media platforms. The prominence of radio reflects its affordability, battery operation and reach in rural areas. This finding is consistent with Idoma and Mamman (2016), who identified extension agents, radio and local

Table 4: Extent of Utilisation of Agroclimatological Information

Agroclimatological Information Utilisation	Always f(%)	Often f(%)	Rarely f(%)	Never f(%)	Mean	SD
Timing sales based on harvest forecasts	89 (42.0)	71 (33.5)	36 (17.0)	16 (7.5)	3.10	0.86
Estimating market prices due to weather trends	52 (24.5)	50 (23.6)	58 (27.4)	52 (24.5)	2.56	1.03
Adjusting production to market demand based on climate conditions	84 (39.6)	76 (35.8)	38 (17.9)	15 (7.1)	3.10	0.84
Planning for drought periods	77 (36.3)	69 (32.5)	43 (20.3)	23 (10.8)	2.97	0.91
Preparing for flooding risks	105 (49.5)	58 (27.4)	32 (15.1)	10 (4.7)	3.20	0.89
Protecting crops from storms	51 (24.1)	59 (27.8)	60 (28.3)	42 (19.8)	2.66	1.00
Reducing heat stress in crops	110 (51.9)	65 (30.7)	25 (11.8)	12 (5.7)	3.30	0.82
Mitigating risks from unexpected weather changes	65 (30.7)	60 (28.3)	55 (25.9)	32 (15.1)	2.80	0.95
Conserving water resources	77 (36.3)	73 (34.4)	40 (18.9)	22 (10.4)	3.00	0.90
Avoiding over-irrigation	60 (28.3)	60 (28.3)	50 (23.6)	42 (19.8)	2.73	1.01
Preparing for water shortages	123 (28.0)	57 (26.9)	20 (9.4)	12 (5.7)	3.36	0.83
Adapting to changing rainfall patterns	45 (21.2)	45 (21.2)	60 (28.3)	62 (29.2)	2.45	1.05
Pest and disease prevention	100 (47.2)	65 (30.7)	31 (14.7)	16 (7.5)	3.18	0.87
Harvest planning	72 (34.0)	65 (30.7)	48 (22.6)	27 (12.7)	2.89	0.93

Source: Field survey, 2025

administrative structures as the most effective climate-information channels for rural communities in Benue State, and with Aduaka et al. (2026), who found that farmers in south-eastern Nigeria depend on a hybrid ecosystem combining face-to-face extension, radio and farmer associations rather than any single channel. The comparative strength of OGADEP and extension agents as sources is noteworthy given the coverage and logistics constraints documented for the programme (Atobatele et al., 2025); it suggests that where extension contact does occur, it is valued and used. The weak performance of internet-based platforms mirrors the digital-access and literacy constraints reported across Nigeria (Okafor et al., 2024). Importantly, comparative evidence from Malawi and Ghana shows that institutionally mediated sources such as extension agents and farmer groups are associated with greater climate resilience than informal or purely digital sources (Amoak et al., 2023), which lends significance to the source hierarchy observed here.

3.4 Extent of Utilisation of Agroclimatological Information

The results in Table 4 revealed that utilisation concentrated on water- and heat-related risk management as preparing for water shortages (3.36), reducing heat stress (3.30), flood preparedness (3.20) and pest and disease prevention (3.18) were mostly utilised by the respondents. Market-oriented applications (estimating prices from weather trends, 2.56) and adaptation to shifting rainfall patterns (2.45, the only item below the benchmark) were least utilised. The lower standard deviations for the top-ranked items (0.82–0.83) indicate broad agreement among farmers on these uses, whereas the higher dispersion for rainfall adaptation and price estimation (1.03–1.05) reflects more divergent practice. The emphasis on water management is consistent with the presence of fish and poultry enterprises in the sample, both of which are acutely sensitive to water availability and temperature. The pattern corroborates Solaja et al. (2024), who found among rice farmers in Kebbi State that access to climate information shaped both the choice and intensity of adaptation practices but did not translate uniformly across all decision domains, and Ifeanyi-Obi and Nnadi (2014), who reported that farmers apply climate information selectively according to the risks they perceive as most immediate. That adaptation to changing rainfall patterns ranked lowest, despite rainfall forecasts being the most recognised awareness item, points to a gap between recognising the relevance of rainfall information and possessing the practical means to act on it, a gap that Nnadi et al. (2019) also observed among farmers in Anambra State.

Table 5: Challenges Confronting the Effective Utilisation of Agroclimatological Information

Constraints factors	Severe f(%)	Mild f(%)	Not a challenge f(%)	Mean	S.D	Rank
Lack of reliable access to agroclimatological information poses a significant obstacle to effective decision-making in farming practices	75 (35.8)	90 (42.5)	47 (22.5)	2.80	0.90	8th
Insufficient technical infrastructure, such as internet connectivity or weather monitoring equipment, hampers farmers' ability to access timely agroclimatological information	119 (56.1)	71 (33.5)	22 (10.4)	3.20	0.75	1st
Limited understanding or knowledge among farmers about how to interpret and apply agroclimatological information undermines its utility in agricultural decision-making	91 (42.9)	85 (40.1)	36 (17.0)	2.90	0.86	6th
The absence of tailored or localized agroclimatological information exacerbates challenges in adapting farming practices to changing environmental conditions	70 (33.0)	94 (44.3)	48 (22.6)	2.75	0.92	9th
Inadequate dissemination channels and outreach efforts hinder farmers' awareness and access to available agroclimatological information resources	99 (46.7)	81 (38.2)	32 (15.1)	3.00	0.82	4th
Limited institutional support and funding for agroclimatological research and extension services restricts the availability and quality of information provided to farmers	95 (44.8)	82 (38.7)	35 (16.5)	2.95	0.84	5th
Socio-economic factors, such as poverty or lack of education, contribute to disparities in farmers' ability to utilise agroclimatological information effectively	111 (52.4)	74 (34.9)	27 (12.7)	3.10	0.78	2nd
Language barriers prevent some farmers from accessing and understanding agroclimatological information provided in unfamiliar languages or dialects	79 (37.3)	91 (42.9)	42 (19.8)	2.85	0.88	7th
The complexity or technical nature of agroclimatological information makes it challenging for farmers to integrate into their decision-making processes	105 (49.5)	76 (35.8)	31 (14.6)	3.05	0.80	3rd

Source: Field survey, 2025

3.5 Challenges confronting effective utilisation.

Results in Table 5 revealed that insufficient technical infrastructure (3.20), socio-economic disadvantage (3.10), the technical complexity of the information (3.05) and inadequate dissemination channels (3.00) were the most severe constraints. These findings corroborate Ifeanyi-Obi and Nnadi (2014) and Idoma and Mamman (2016), who identified literacy, resource constraints and weak institutional coordination as the principal limits on climate-information use in Nigeria, and are consistent with the funding, logistics and coverage deficits identified within OGADEP itself (Atobatele et al., 2025). The prominence of complexity and language barriers reinforces the argument of Aduaka et al. (2026) that advisory content must be not merely accessible but comprehensible and locally framed, and the identification of infrastructure as the leading constraint echoes Okafor et al. (2024), who rank weak dissemination infrastructure among the most persistent barriers to agricultural adaptation in Nigeria.

4. Conclusion

Crop farmers in Ogun State perceived rainfall forecasts for planting decisions (3.18) as the most relevant and

useful agroclimatological information and make substantial use of it, particularly for managing water- and heat-related risks. Radio, OGADEP and extension agents are the principal channels through which the information reaches them, while social-media platforms remain marginal. Utilisation is constrained chiefly by inadequate technical infrastructure, socio-economic disadvantage, the technical complexity of the information and weak dissemination channels. The study concludes that the availability, accessibility and comprehensibility of agroclimatological information, mediated by farmers' educational capacity, are the paramount determinants of its practical application in Ogun State.

5. Recommendations

Agricultural extension services, in collaboration with NiMet, should intensify awareness campaigns through radio, farmer cooperatives and extension agents, the channels farmers already use most. Also, OGADEP and partner institutions should conduct capacity-building workshops that train farmers to interpret and apply agroclimatological data in planting, irrigation, pest control and enterprise-specific decisions for crop, poultry and fish systems. Also, Government should invest in rural communication infrastructure, including mobile network coverage, community radio and local weather-monitoring stations, to improve the timeliness and reliability of information delivery. Lastly, Agroclimatological information should be simplified, translated into Yoruba and other local languages, and tailored to the agro-ecological conditions of each OGADEP zone, and institutional collaboration among NiMet, OGADEP and research institutes should be strengthened to ensure accurate and relevant dissemination.

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