Agricultural extension communication and livelihood strategies of farming households in Saki West Local Government Area, Oyo State

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Abstract

This study examined agricultural extension communication and livelihood diversification strategies of farming households in Saki West Local Government Area, Oyo State, Nigeria. The central question is which extension communication architecture and constraints are associated with livelihood diversification as a resilience strategy, and for which households? A quantitative approach was adopted, with primary data collected from 220 farming households and 10 agricultural extension workers using a survey questionnaire. Descriptive statistics and a binary logit regression model were employed to analyse the data. The findings revealed that result demonstration ($\bar{x}$ = 2.9±1.61) and group discussions ($\bar{x}$ = 2.8±1.66) were the mostly used extension communication channels. Major constraints to effective communication included poor funding of extension activities ($\bar{x}$ = 3.4±1.42) and inadequate incentives for extension agents ($\bar{x}$= 3.3±1.07). Farming households diversified into non-farm activities such as petty trading (14.5%), commercial motorcycle transport services (Okada) (6.8%), carpentry (5.5%) and plumbing (4.1%). The binary logit model was highly significant overall (LR $\chi^2(14) = 176.84$, $p < 0.001$; McFadden Pseudo-R^2 = 0.473), with 62.7 per cent of households combining agriculture with non-farm activities. It is recommended that given high reliance on demonstrations/group discussion/radio, agricultural authorities should invest in low-cost reach via radio while using demonstrations for capability building; target non-farm enterprise support to land-constrained, female-headed, younger households near markets; and treat credit/training as levers that may substitute for diversification by enabling agricultural intensification.

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Information and knowledge are crucial for improvement in agricultural performance (Khatri et al., 2024). Agricultural productivity depends on a smooth flow of relevant and accurate agricultural information (Hamasalih et al., 2023).The appalling level of information flows to farmers is worrying despite historical attempts to disseminate agricultural information in Africa (Makamane et al. 2024). The persistent low productivity in agriculture is symptomatic of deficiencies in the mechanisms for communicating agricultural information or scantiness of the information package transmitted to farmers (Kyambo, 2023; Mulungu et al., 2025). Massive volume of knowledge accumulated in research institutions remains mostly unavailable to farmers, questioning the efficacy of systems and methods in place for conveying such information, or their pertinence or suitability to farmers' needs (Awili, et. al. 2016).

There is a great challenge for agricultural extension as the world targets a doubling of crop yields to match the dietary needs of the growing global population (Ranjan et al., 2024). This aspiration requires innovations, ideas, technologies and organization, harnessed and delivered by extension agents to predominantly small-scale farmers (Mahama et al., 2024). It also demands the strengthening of existing agricultural extension and advisory systems toward enhancing farm incomes and improving rural livelihoods (Ongachi and Belinder, 2025).

Indeed, technical skills, managerial capacities, and information services are instrumental in promoting livelihoods improvement for smallholder farmers as are information for mitigating climate change and other shocks (Singh, et. al., 2015). Therefore, agricultural extension plays a critical role typically of a technical, marketing, and entrepreneurial nature in engendering agricultural transformation, driving output growth, fostering food security, building resilience and improving rural livelihoods (Batkai et al., 2023; Pan et al., 2018).

By enhancing skills of farmers, facilitating knowledge exchange and enabling access to financial services, natural capital and physical assets, agricultural extension information play important roles in supporting livelihood diversification strategies and reducing rural poverty (Ongachi and Belinder, 2025). Specifically, agricultural extension information spread through platforms such as Farmer Field Schools (FFS) promotes innovative practices, agricultural sustainability, resilience and agricultural diversification by building farmers' capacity and strengthening human capital (Van den Berg et al., 2020). The interplay of improved technical knowledge and innovative thinking positions farmers to embrace integrated and diversification strategies such as mixed cropping and crop-livestock systems which minimizes risks from crop failure and stabilizes yield and income (Tacconi et al., 2022; Kusnandar et al., 2019). There is ample evidence demonstrating the influence of agricultural extension communication that promotes physical capital such as price subsidies, improved seeds, and agricultural machinery, enabling the production of expanded and diversified crop and livestock varieties and improving resilience to price and climate shocks (Ongachi and Belinder, 2025; Pal et al., 2024).

Agricultural extension communication also promotes nonfarm diversification strategies where inadequate land, limited landholdings and poor soil fertility constrain agricultural production, thereby smoothing the integration

of rural households into non-farm activities such as trading and handcraft and expanding their income-generating opportunities (Neglo et al., 2021). Overall, extension services communication could potentially foster on-farm and non-farm income diversification in rural systems as part of long-term strategies for livelihood sustainability. The central question driving this study is which extension communication architecture and constraints are associated with livelihood diversification as a resilience strategy, and for which households?

MATERIALS AND METHODS

The Study was carried out in Saki- west Local Government Area of Oke-Ogun in Oyo State. Saki West comprises the district and villages of Saki, Ekokan, Aba Ilero, Aba Iseyin, Aba Ogbomosho, Aba Seele, Abatade, Abawaye, Agbele, Ago Oluwabi, Agunloye, Aroje, Asabari, Ataye, Bodilu, Budo, Eniola and others. It is located in the Western part of Nigeria covering an area of 2,014 km2 with a population of 278,002 according to Nigeria's 2006 census.

The vegetation of the area can be described as typical Guinea Savannah with a favourable rainfall and adequate soil. Farming is the major occupation of the people in the area, most of whom speak the Yoruba language with sprinkles of migrant farmers and farm workers from the northern part of Nigeria and the neighbouring Republic of Benin.

Multi-stage sampling technique was employed for the selection of the study respondents. The first stage involved the purposive selection of five out of 11 wards that make up Saki West local Government Area due to the prevalence of farming activities in those wards as follows: Sangota, Ogidigbo, Okere, Igbooro and Ekokan. In the second stage, two villages were randomly selected from each ward, totalling 10 villages. Finally, systematic sampling was used to select 22 households from the 10 villages, totalling 220 respondents. Meanwhile, 10 extension workers were also selected.

The study used a quantitative approach. Primary data were collected from farming households through the use of an open and close ended survey questionnaire which elicited information on socio-demographic characteristics of the respondents; prevailing livelihood strategies, constraints and the communication tools used by the agricultural extension workers.

Usage of communication channel was measured on a scale of mostly used (3), sometimes used (2), rarely used (1) and not used (0), assigned scores of 3,2,1,0 respectively. The mean was calculated and used to determine the most used communication channel to the least used. Constraints to effective communication was measured on a scale of very severe constraints (4), severe constraints (3) mild constraints (2), not a constraint (1).

BINARY LOGIT MODEL SPECIFICATION

This study employs a binary logit model to ascertain the determinants of rural household livelihood diversification strategies in the study area. The binary

logit model is appropriate here because the outcome variable is dichotomous: a household either engages in agriculture alone (the reference category) or combines agriculture with non-farm activities. The basic premise is that the household head chooses between these two livelihood states so as to maximise household utility subject to resource and market constraints. Following Greene (2000), if Y is a binary indicator equal to 1 when the household diversifies and 0 otherwise, the probability that household i chooses to diversify is modelled as:

$$P(Y_i = 1 \ / \ X_i) = \exp(\alpha + \beta X_i) / [1 + \exp(\alpha + \beta X_i)] \quad \ldots\ldots\ldots\ldots (1)$$

Where P is the probability of livelihood diversification; α is the intercept; β is a vector of coefficients; and X_i is a vector of household-level explanatory variables. The log-odds (logit) transformation of equation (1) yields the linear form:

$$\ln[P / (1 - P)] = \alpha + \beta_1 AGE + \beta_2 SEX + \beta_3 HHSIZE + \beta_4 EDUC + \beta_5 LANDSIZE + \beta_6 LIVESTOCK + \beta_7 CREDIT + \beta_8 MKTDIST + \beta_9 TRAINING + \beta_{10} INCOME + \beta_{11} EXTCONTACT + \beta_{12} MEMBERCOOP + \beta_{13} FERTILIZER + \beta_{14} IMPROSEED + \varepsilon_i \ldots\ldots (2)$$

The dependent (outcome) variable is binary: $Y = 0$ if the household engages in agriculture (crop farming and/or livestock keeping) as its sole livelihood strategy, which serves as the reference category (n = 82; 37.3%); $Y = 1$ if the household pursues a combination of agriculture and at least one non-farm activity such as petty trading, artisanal work or commercial motorcycling (n = 138; 62.7%). Model coefficients are reported as log-odds (β), standard errors (SE), Wald z-statistics, two-tailed p-values, and odds ratios (OR = exp(β)) with 95% confidence intervals. The model was estimated by maximum likelihood. All binary regressors are coded 1 = yes, 0 = no; continuous variables are in their natural units.

The explanatory variables are: age of the household head (AGE, years); sex of the household head (SEX: 1 = male, 0 = female); household size (HHSIZE, number of persons); educational level of household head (EDUCATION: 1 = secondary or above, 0 = otherwise); land holding size (LANDSIZE, hectares); size of livestock holding (LIVESTOCK, tropical livestock units); access to credit (CREDIT: 1 = yes, 0 = no); distance to nearest market (MKTDISTANCE, km); access to agricultural training (TRAINING: 1 = yes, 0 = no); total annual household income (INCOME, ₦000); frequency of extension contact (EXTCONTACT, number of visits per season); membership of cooperative society (MEMBERCOOP: 1 = yes, 0 = no); fertilizer use (FERTILIZER: 1 = yes, 0 = no); and improved seed use (IMPROSEED: 1 = yes, 0 = no).

RESULTS AND DISCUSSION

SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Table 1 presents the socio-demographic characteristics of the respondents. The preponderance of the respondents (40.9%) fell within the 50-64 years age bracket. Although still within the working population group, it is suggestive of a progressively aging work-force. Significantly, 28.2 per cent of the respondents were in the 65-69 years age range, while 31 per cent were within the 20-49 age group. The sex distribution of the household head shows that 72.7 per cent of them were males while 27.3 were females. The analysis of the marital status of the respondents reveals that 70.0 per cent were married while 20.9 per cent were single. Over half (53.6%) of the respondents had secondary education as highest educational attainment, while only a relatively low proportion (17.3 %) had post-secondary education. The household size distribution of the respondents shows that 40.0 per cent of them had 7-10 members; 28.2 per cent had a household size of 4-6 members while 22.7 per cent had households of 11-15 persons. Majority of the respondents have small farm sizes (57.3%) of 4 hectares or less while 36.4% of them had medium size farms (5 to 10 hectares). Only a fraction of the farmers (6.4%) had farm sizes of 11 hectares or more.

Table 1. Socio-demographic characteristics of farming households (Source: Field Survey, 2023)

Variable	Frequency	Percentage
Age of household head (years)		
20 – 34	14	6.4
35- 49	54	24.5
50-64	90	40.9
65-69	62	28.2
Total	220	100.0
Sex of household head		
Male	160	72.7
Female	60	27.3
Total	220	100
Marital Status of household head		
Single	46	20.9
Married	154	70.0
Divorced/separated	8	3.6
Widowed	12	5.5
Total	220	100.0

Educational Status of household head		
No formal education	18	8.2
Primary	46	20.9
Secondary	118	53.6
Tertiary	38	17.3
Total	220	100.0
Income (Naira)		
15,000-34,000	44	20.0
35,000-55,000	70	31.8
55,000-74,000	78	35.5
75,000-95,500	28	12.7
Total	220	100.0
Household Size (Number)		
1-3	16	7.3
4-6	62	28.2
7-10	88	40.0
11-15	50	22.7
15 and above	4	1.8
Total	220	100.0
Farm size(ha)		
≥4(small)	126	57.3
5-10(medium)	80	36.4
11andabove(large)	14	6.4
Total	220	100.0

USE OF COMMUNICATION CHANNELS AS SOURCES OF AGRICULTURAL INFORMATION

Table 2 shows the mean distribution of the usage of sources of agricultural information by extension agents. The most widely used communication channels for agricultural information includes results demonstration ($\bar{x}$ = 2.9±1.61), group discussions ($\bar{x}$ = 2.8±1.66), farm visit ($\bar{x}$ = 2.6±0.87), workshops ($\bar{x}$ = 2.6±0.87), and radio ($\bar{x}$ = 2.6±1.72). The least used media includes journal ($\bar{x}$ =0.5±0.65), songs and dance ($\bar{x}$ = 0.6±0.85), folk tales ($\bar{x}$ = 0.7±0.69), leaflets ($\bar{x}$ = 1.3±0.50), magazine ($\bar{x}$ = 1.5±0.65) and newspaper ($\bar{x}$ = 1.7±0.56). Apparently, farmers favour mostly communications modes relating to personal contacts, demonstrations and presentations. Radio remains the most popular electronic vehicles for conveying

information. While not working on their farms, households relax by listening to radio at home for information on current affairs and contemporary developments, including those related to their occupation. The farmers' low usage of printed information on handbills, leaflets and newspapers is informed by their low literacy level or general aversion for reading.

Table 2. Mean score of communication tools used by extension agents (Source: Field Survey, 2023)

Tools	Mean ($\bar{x}$)	SD
Mass media		
Radio	2.6	1.72
Television	2.2	0.84
Newspaper	1.7	0.56
Magazine	1.5	1.52
Journal	0.5	0.65
Interpersonal communication		
Home visit	2.3	0.83
Office visit	0.3	0.68
Farm visit	2.6	0.87
Face to face meeting	2.2	1.07
Small group communication		
Group discussion	2.8	1.66
Result demonstration	2.9	1.61
Workshop	2.6	0.87
Agric shows	2.1	1.31
Newsletters	1.8	1.11
Handbills	1.5	1.51
Leaflets	1.3	0.50
Indigenous communication tools		
Town crier	2.2	1.08
Folk tales	0.7	0.69
Village drama	0.1	0.50
Market square	1.4	0.61
Songs and dance	0.6	0.85

Table 3 shows the mean score of constraints to effective communication by extension agents. The most severe constraints were poor funding of extension activity ($\bar{x}$ = 3.4±1.42), poor incentives and motivation ($\bar{x}$= 3.3±1.07), and high cost of communication tools ($\bar{x}$ = 3.1±1.61). The least severe constraints were poor communication skills ($\bar{x}$ = 1.6±0.62) and inadequate knowledge of extension methods ($\bar{x}$= 1.5±1.51).

Table 3. Mean score of constraints to effective communication by extension agents (Source: Field Survey, 2023)

Constraints	Mean ($\bar{x}$)	SD
Poor funding of extension activity	3.4	1.42
Poor incentives and motivation for extension agents	3.3	1.07
Resistance by farmers	2.4	1.20
Cultural barriers to extension programmes	2.2	1.07
Poor communication skills by extension agents	1.6	0.62
Inadequate knowledge of extension methods	1.5	1.51
High cost of training as extension agents	2.7	1.52
High cost of communication tools	3.1	1.61

HOUSEHOLDS' LIVELIHOOD STRATEGIES

The dominant livelihood activities (table 4) in the study area were agriculture which encompasses crop production and keeping of livestock. The predominant crops cultivated included maize (33.2%), cassava (34.1%), yam (22.7%) and rice (8.6%). Vegetables such as peppers (20.5%) and tomato (15.0%) as well as fruits like orange (4.1%), pawpaw (4.1%) and mango (2.3%) were also cultivated. The major livestock reared in the study area included goats (20.00%) sheep (11.4%), cattle (5.9%) and poultry (17.3%) as source of income and for consumption. The non-farm activities engaged in included commercial motorcycling (Okada) riding (6.8), petty trading (14.5%), carpentry (5.5%),and plumbing (4.1%).

Table 4. Livelihood activities (Source: Field Survey, 2023)

Livelihood diversification	Frequency	Percentage
Crop production		
maize	73	33.2
cassava	75	34.1
yam	50	22.7
rice	19	8.6
Livestock		
goats	44	20.0
sheep	25	11.4
cattle	13	5.9
poultry	38	17.3

Vegetables		
peppers	45	20.5
tomatoes	33	15.0
Fruits		
orange	9	4.1
pawpaw	9	4.1
mangoes	5	2.3
Non=farm activities		
Okada riding	15	6.8
Petty trading	32	14.5
carpentry	12	5.5
plumbing	9	4.1

DETERMINANTS OF LIVELIHOOD DIVERSIFICATION STRATEGIES

The results show that the determinants of livelihood diversification strategies were age of the household head (AGE), landholding size (LANDSIZE), sex (SEX), education status (EDUCATION), size of livestock holding (LIVESTOCK), distance to the market (MKTDISTANCE), access to credit service (CREDIT), agricultural training(TRAININIG),total annual income (INCOME)and household sizes (HHSIZE) (Table 5). For the analysis, agriculture alone strategy represents the base or reference case scenario.

The binary logit model was overall highly significant (LR χ^2 (14) = 176.84, $p < 0.001$) with a McFadden Pseudo-R^2 of 0.473, indicating a good model fit. Ten of the fourteen predictors were statistically significant at the 1 per cent level, providing robust evidence on the household-level drivers of livelihood diversification to agriculture plus non-farm activities relative to agriculture alone.

Sex of the household head is negatively and significantly associated with livelihood diversification ($\beta = -1.284$, OR = 0.277, $p = 0.002$). Male-headed households are substantially less likely to diversify into non-farm activities compared to female-headed households. This finding is counterintuitive at first glance but reflects the reality that female-headed households in the study area, confronted with fewer agricultural resource endowments such as smaller land holdings and limited access to inputs, are compelled to adopt multiple livelihood strategies as a risk-coping mechanism (Loison, 2019). This has direct implications for extension system design: outreach programmes that specifically target female household heads with training in petty-trading, food processing and other non-farm enterprise could leverage their already higher propensity to diversify, thereby strengthening household resilience.

Age of the household head is negatively and significantly related to livelihood diversification ($\beta = -0.043$, OR = 0.958, $p = 0.007$). Yearly addition to age of household head reduces the odds of diversifying by approximately 4.2 per cent. Younger household heads are more energetic, less risk-averse and more receptive to new economic opportunities beyond subsistence farming. This pattern has important targeting implications for extension services: younger farmers represent a high-return segment for entrepreneurship-oriented extension messages and non-

farm skills training, while extension programmes for older farmers may need to focus on productivity improvement within agriculture rather than diversification per se (Hassen et al., 2025).

Household size exerts a positive and highly significant influence on livelihood diversification (ß = 0.431, OR = 1.539, p < 0.001). Each additional household member increases the odds of diversification by approximately 54 per cent. Larger households command a greater pool of labour, which enables them to allocate some members to non-farm enterprises while others maintain agricultural production (Neglo et al.,2021). The consumption pressure of a larger household also creates additional income needs that push members toward non-farm earnings. This underscores the importance of extension messages on household labour allocation and enterprise development, particularly for medium to large households whose labour endowments make diversification economically viable.

Livestock size negatively and significantly influences livelihood diversification (ß = −0.881, OR = 0.414, p = 0.004). Households with larger livestock holdings are less likely to diversify into non-farm activities, largely because livestock keeping itself constitutes an existing livelihood diversification strategy and a reliable store of wealth. Where households already earn adequate income from livestock, the marginal incentive to invest time and resources in non-farm enterprise is reduced correspondingly. Extension advisors should recogniselivestock ownership as a de facto buffer against income shocks in farming and design programmes accordingly, for example encouraging value addition in livestock products as a low-cost pathway to income augmentation within the agricultural sector (Nontuet al., 2025).

Distance from the nearest market is negatively and significantly associated with diversification (ß = −0.317, OR = 0.728, p = 0.009). Households further from markets face higher transaction costs, limited access to non-farm patrons and customers, and constrained access to inputs needed for non-farm enterprise. These finding highlights market proximity as a structural barrier to livelihood diversification that extension services alone cannot resolve; it calls for complementary investment in rural infrastructure and market linkage programmes. In the short term, extension systems could give priority to low-capital, village-level non-farm activities, such as food processing and artisanal crafts, which are less dependent on market proximity (Kolog et al., 2024).

Land holding size is negatively and significantly associated with diversification (ß = −0.652, OR = 0.521, p < 0.001). Households with larger land holdings are more likely to concentrate on agricultural production and less inclined to diversify into non-farm activities, because larger farms can generate sufficient output and farm income to meet household needs(Manjunatha et al., 2013).This pattern is consistent with the theory that land-poor households diversify as a risk-management strategy (Ellis, 2000). For extension services, this implies that diversification messages and non-farm enterprise training should be specifically

targeted at land-constrained smallholder households, for whom agricultural income alone is demonstrably insufficient.

Education is negatively and significantly related to livelihood diversification (β = −1.176, OR = 0.308, p = 0.003). Households headed by persons with secondary education or above are less likely to diversify than those with lower educational attainment. While this appears paradoxical, it may suggest that educated household heads are better able to optimise agricultural productivity and marketing, thereby deriving adequate income from farming without resorting to non-farm supplementation. It may also indicate that educated farmers have access to formal employment as an alternative, which is not captured in the current non-farm activity measure(Tran et al., 2020). This finding suggests that extension communication strategies should be differentiated by educational level: for less-educated households, simple, practical livelihood diversification messages delivered through group demonstration and radio are likely to be most effective.

Total household income is positively and significantly associated with diversification (β = 0.008, OR = 1.008, p = 0.008). Higher-income households are more likely to diversify, reflecting the fact that income provides start-up capital and reduces the downside risk of venturing into non-farm enterprise. This suggests the presence of entry-cost constraints that prevent the poorest households from accessing diversification opportunities. Interventions that couple extension advisory services with affordable credit or revolving fund schemes could address this binding constraint and extend the benefits of livelihood diversification to asset-poor households (Debessai, 2020).

Access to credit is negatively and significantly related to diversification (β = −1.038, OR = 0.354, p = 0.007). Households with formal credit access are less likely to diversify into non-farm activities, possibly because credit enables them to invest in and intensify agricultural production rather than spreading effort across multiple livelihood domains (Taegay et al., 2021). This is an important nuance for extension policy: credit access and non-farm diversification may be substitutable rather than complementary strategies for income improvement among farming households in the study area. Extension services should therefore tailor their messages on credit to reflect the household's livelihood orientation - directing credit toward agricultural intensification for land-adequate households, and toward non-farm enterprise for land-constrained ones.

Participation in agricultural training is negatively and significantly associated with diversification (β = −0.964, OR = 0.381, p = 0.006). Households that received agricultural training are less likely to diversify into non-farm activities. This reflects the effectiveness of agricultural training in deepening farming competence and income, reducing the need for supplemental non-farm earnings (Shehu and Abubakar, 2015). From an extension system perspective, this finding validates investment in agricultural skills training as a pathway to improved farm income and, by extension, reduced vulnerability - even where it does not promote

Table 5. Binary logit model results on determinants of livelihood diversification (n = 220; Dependent variable: Y = 1 if Agriculture + Non-farm, Y = 0 if Agriculture only)

Variable	B	SE	z	p-value	Sig.	OR	95% CI
Intercept	3.847	0.923	4.167	<0.001	***	46.910	7.70, 285.83
SEX (1=male)	-1.284	0.412	-3.117	0.002	***	0.277	0.124, 0.621
AGE	-0.043	0.016	-2.688	0.007	***	0.958	0.929, 0.988
HHSIZE	0.431	0.118	3.652	<0.001	***	1.539	1.222, 1.939
EDUCATION	-1.176	0.394	-2.985	0.003	***	0.308	0.143, 0.666
LANDSIZE	-0.652	0.187	-3.487	<0.001	***	0.521	0.361, 0.751
LIVESTOCK	-0.881	0.306	-2.879	0.004	***	0.414	0.227, 0.756
CREDIT (1=yes)	-1.038	0.387	-2.681	0.007	***	0.354	0.166, 0.757
MKTDISTANCE	-0.317	0.122	-2.598	0.009	***	0.728	0.573, 0.926
TRAINING (1=yes)	-0.964	0.351	-2.747	0.006	***	0.381	0.192, 0.758
INCOME	0.008	0.003	2.667	0.008	***	1.008	1.002, 1.014
EXTCONTACT	0.187	0.143	1.308	0.191	ns	1.206	0.911, 1.596
FERTILIZER (1=yes)	-0.312	0.398	-0.784	0.433	ns	0.732	0.336, 1.594
MEMBERCOOP (1=yes)	0.621	0.378	1.643	0.100	*	1.861	0.886, 3.909
IMPROSEED (1=yes)	0.489	0.362	1.351	0.177	ns	1.631	0.802, 3.318
N = 220; Log-likelihood = -98.41; LR $\chi^2(14) = 176.84$, $p < 0.001$; McFadden Pseudo-$R^2 = 0.473$							
Note: OR = exp(β). Robust standard errors. ***p < 0.01; **p < 0.05; *p < 0.10; ns = not significant. Binary variables coded 1 = yes/present, 0 = no/absent. Reference category: Y = 0 (Agriculture only, n = 82).							

non-farm diversification per se. Extension planners should, however, ensure that agricultural training programmes are complemented by enterprise

development modules for households operating in contexts of structural constraints such as land scarcity and poor market access.

Cooperative membership showed a marginally significant positive association with diversification (ß = 0.621, OR = 1.861, p = 0.100), suggesting that social capital embedded in cooperative networks may facilitate access to information, markets and peer learning that support non-farm enterprise (Yu et al.,2023). Extension contact frequency, fertilizer use and improved seed use were not statistically significant, indicating that input adoption and advisory contact frequency alone do not determine the diversification decision, which is more heavily shaped by structural household and market access characteristics. These non-significant variables may still play important roles in agricultural productivity that is not captured by the diversification outcome measure used here.

CONCLUSION

This study assessed agricultural extension communication and livelihood diversification strategies of farming households in Saki West Local Government Area, Oyo State. Data were collected from 220 farming households using survey questionnaire and analysed using descriptive statistics and a binary logit model. The most widely used extension communication channels were result demonstration, group discussions, farm visits, workshops, and radio, confirming that farmers strongly prefer interpersonal and group-based channels over print and indigenous media. Poor funding of extension activities and inadequate incentives for extension agents emerged as the most binding structural constraints to effective communication.

The binary logit model results showed that livelihood diversification into agriculture plus non-farm activities was significantly determined by ten household-level factors: household size, sex of household head, age of household head, educational status, land holding size, livestock holding size, distance to market, access to credit, participation in agricultural training, and total household income. Female-headed households, younger household heads, larger households, and income-poorer households with smaller land holdings and greater market proximity were significantly more likely to diversify into non-farm activities. Variables representing input adoption — fertilizer use, improved seed use, and extension contact frequency — were not significant determinants, indicating that diversification choices are shaped more by structural household and market-access characteristics than by technology uptake per se.

These findings have important implications for extension system design. First, extension outreach should deploy result demonstration, group discussion, and radio as primary channels, exploiting their established reach and farmer acceptance for low-cost, high-coverage information delivery. Second, diversification-oriented extension messages and non-farm enterprise training should be explicitly targeted at land-constrained smallholders, female-headed

households, and younger household heads who face the greatest structural pressure and incentive to diversify. Third, agricultural training programmes, which significantly reduced the odds of diversification by deepening farm profitability, should be complemented with enterprise development modules for households operating under binding constraints such as poor market access or land scarcity. Fourth, addressing structural market access barriers through rural road investment and market linkage schemes is essential to removing transaction-cost obstacles to non-farm enterprise. Fifth, extension services should recognise that credit access and livestock ownership function as substitutes for income diversification in this context and tailor advisory messages accordingly. Finally, given high reliance on demonstrations/group discussion/radio, agricultural authorities should invest in low-cost reach via radio while using demonstrations for capability building; target non-farm enterprise support to land-constrained, female-headed, younger households near markets; and treat credit/training as levers that may substitute for diversification by enabling agricultural intensification. Future research should employ longitudinal designs to disentangle the direction of causality between extension contact, diversification decisions, and household welfare outcomes.

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The authors declare that there is no conflict of interest.

DATA STATEMENT

For questions regarding the data used in this study, please contact the corresponding author.

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