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Agricultural extension as a catalyst for integrated rural development: Connecting farming with non-farm livelihood options

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Abstract

Roughly 68% of rural households in Pacific Island nations depend on agriculture as their main income source, yet fewer than a quarter earn enough from farming alone to meet basic household expenses. This research investigated whether agricultural extension services could function as a bridge between on-farm production and non-farm livelihood options, using Fiji as a case setting. A cross-sectional survey of 213 smallholder farming households across three provinces in Viti Levu was conducted between June 2022 and January 2023, supplemented by focus group discussions with 18 extension officers and 32 community leaders. The research was based at the Fiji National University, Nausori, and data were gathered through face-to-face interviews using a pretested semi-structured questionnaire. Results indicated that 71.8% of farmers who had received diversified extension advice (covering both agricultural techniques and non-farm enterprise options) had started at least one supplementary income activity, compared to 29.3% among farmers receiving conventional agricultural extension only. Agro-processing was the most preferred non-farm activity (27.4%), followed by handicrafts and artisanal work (19.8%) and eco-tourism ventures (16.3%). Household income among diversified-advisory recipients was on average 43.6% higher than that of the conventional group. Extension officers reported that the main barriers to delivering integrated advice were a lack of training on non-farm enterprise topics and the absence of formal linkages with microfinance institutions and vocational training providers. Focus group data revealed that women farmers were more likely to pursue non-farm options than men, with 62.7% of female respondents engaged in at least two livelihood streams. The findings suggest that extension systems in small island developing states can meaningfully support rural livelihood diversification when agents are equipped with broader advisory skills and connected to relevant service networks beyond the agricultural sector.

Keywords: Agricultural extension, rural development, livelihood diversification, non-farm livelihoods, smallholder farmers, Pacific Islands, Fiji, extension advisory, agro-processing, integrated development

Introduction

Nearly 1.3 billion people across the developing world live on farms too small to generate adequate household income from agricultural production alone ^[1]. In Pacific Island countries, where arable land is limited and markets are geographically fragmented, this figure carries particular weight. Fiji's agricultural census of 2020 reported that the average smallholder farm covered just 1.8 hectares, and roughly 57% of farming households fell below the national poverty threshold despite being actively engaged in crop or livestock production ^[2].

For decades, agricultural extension services in Fiji and similar Pacific nations have focused almost exclusively on improving crop yields and livestock management. The underlying assumption has been that better farming techniques will translate into better livelihoods. But the arithmetic of smallholder farming in island economies often doesn't support this assumption. Land constraints, cyclone exposure, soil degradation, and volatile commodity prices mean that even substantial yield improvements may not push farming households above the poverty line ^[3]. This has led a growing number of development practitioners and researchers to argue that extension services need to broaden

their scope beyond production advice ^[4, 5].

The concept of integrated rural development, which emerged in the 1970s and fell out of favor before experiencing a revival in the early 2000s, offers a framework for thinking about this broader role ^[6]. At its core, the concept holds that rural poverty cannot be addressed through agricultural interventions alone but requires coordinated investments across farming, off-farm employment, infrastructure, education, and social services. Extension services, with their existing reach into rural communities, are well positioned to serve as a connecting point between these different elements ^[7].

Several countries in Sub-Saharan Africa and South Asia have experimented with pluralistic extension models that include livelihood diversification components. In Kenya, the National Agricultural and Livestock Extension Programme incorporated market linkage and enterprise development modules with reported increases in household income ^[8]. In Bangladesh, the Department of Agricultural Extension partnered with NGOs to offer joint technical and business training, leading to measurable improvements in women's economic participation ^[9]. These examples suggest that the concept can work, but evidence from the Pacific Islands context remains thin ^[10].

This research set out to examine whether agricultural extension in Fiji could serve as a catalyst for connecting smallholder farmers with non-farm livelihood options. Specifically, it compared livelihood outcomes between farmers who received conventional agricultural extension and those who received a diversified advisory package that included information and referrals related to agro-processing, handicrafts, eco-tourism, and small business management. The research also explored the perspectives of extension officers and community leaders on the feasibility and challenges of delivering integrated livelihood advisory services in the Fijian context ^[11, 12].

Theoretical framework

This research was grounded in the Sustainable Livelihoods Framework as articulated by the UK Department for International Development ^[13]. The framework identifies five categories of capital, human, natural, financial, physical, and social, that rural households draw upon to construct their livelihoods. It positions institutions and policies, including extension services, as mediating structures that influence how households access and combine these assets. Applied to this research, the framework helped to explain why some farming households successfully diversified their income sources while others did not: households with stronger social capital and better access to extension-mediated information networks were more likely to pursue non-farm options. The framework also informed the research design by directing attention to the institutional linkages between extension services and other support providers such as microfinance agencies and vocational training centers ^[14].

Materials and Methods

Materials

The research was conducted across three provinces in Viti Levu, Fiji's main island: Naitasiri, Tailevu, and Rewa. Data collection took place between June 2022 and January 2023, coordinated from the School of Agriculture at Fiji National University, Nausori. A total of 213 smallholder farming households were selected using multi-stage cluster sampling, with villages as primary sampling units. Inclusion criteria required participants to be household heads or their spouses, aged 21 to 65, actively farming on holdings of less than five hectares, and resident in their current village for at least five years. Eighteen extension officers from the Fiji Ministry of Agriculture and 32 community leaders (village headmen and women's group chairpersons) were also recruited for focus group discussions. Ethical approval was

obtained from the Fiji National University Research Ethics Committee (Protocol FNU-REC-2022-031, dated May 2022). Written informed consent was obtained from all participants prior to data collection ^[15].

Methods

A mixed-methods design was employed. Quantitative data were collected through face-to-face interviews using a pretested semi-structured questionnaire covering farm characteristics, household income sources, extension service engagement history, non-farm livelihood activities, and perceived barriers to diversification. The questionnaire was piloted with 22 farmers in a non-sampled village and revised based on feedback. Farmers were categorized into two groups based on the type of extension advice received in the preceding 24 months: conventional agricultural extension only (n=98) and diversified advisory covering both farm and non-farm options (n=115). This classification was based on self-reported extension contact records cross-verified with extension officer logs. Four focus group discussions (two with extension officers, two with community leaders) were conducted in English and Fijian, each lasting 60 to 90 minutes, and recorded with participant permission. Quantitative data were analyzed using Stata version 17, employing chi-square tests for categorical comparisons and independent samples t-tests for continuous variables. Qualitative data were analyzed using directed content analysis following Hsieh and Shannon's approach ^[16]. Household income was calculated as total annual cash and in-kind income across all livelihood streams.

Ethical considerations

The research involved rural communities where cultural protocols shape research interactions. Before entering any village, the research team followed the traditional sevusevu ceremony, presenting kava to the village chief and seeking communal permission to conduct the research alongside individual consent. Participants were assured that their responses would remain confidential and that no identifying information would be shared with government agencies or extension officers. Given the economic sensitivity of income data, all financial information was collected in private settings rather than in group environments. Focus group participants were reminded that their comments would be anonymized in all reports. Data files were password-protected and stored on secure servers at Fiji National University with access limited to the research team.

Results

Table 1: Livelihood Diversification Outcomes by Extension Advisory Type

Indicator	Conventional (n=98)	Diversified (n=115)	Difference	p-value
Started ≥ 1 non-farm activity (%)	29.3	71.8	+42.5	<0.001
Mean household income (FJD/yr)	8,420	12,090	+3,670	<0.001
No. of livelihood streams (mean)	1.4	2.7	+1.3	<0.001
Women engaged in ≥ 2 streams (%)	34.1	62.7	+28.6	<0.001

Table 2: Barriers to Delivering Integrated Advisory Reported by Extension Officers (n=18)

Barrier Identified	Officers Citing (%)	Rank
Lack of non-farm enterprise training	88.9	1
No formal links to microfinance providers	77.8	2
Heavy workload from existing mandate	72.2	3
Absence of monitoring tools for non-farm outcomes	61.1	4
Limited transport to remote villages	55.6	5

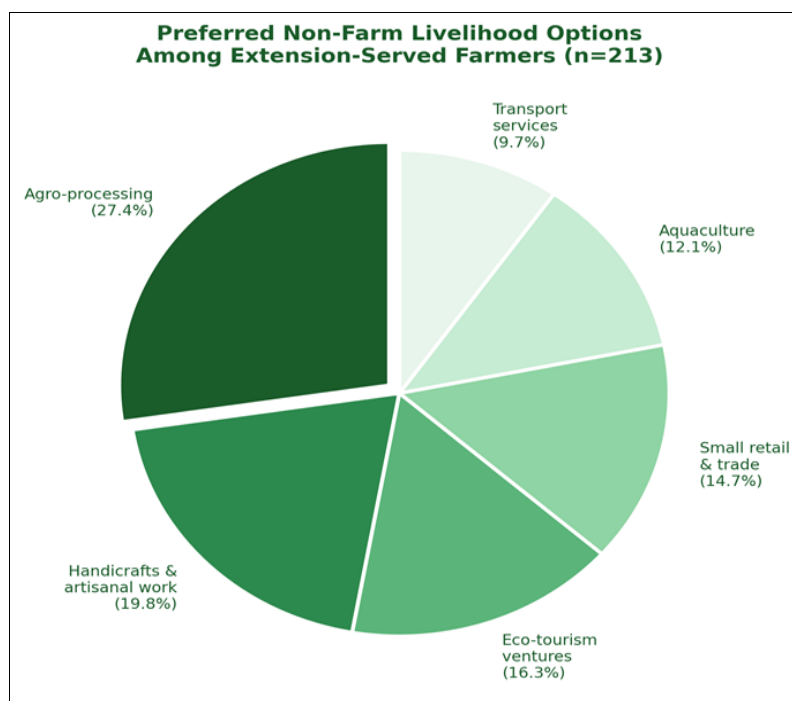


Fig 1: Distribution of preferred non-farm livelihood options among extension-served farming households in Viti Levu, Fiji (n=213)

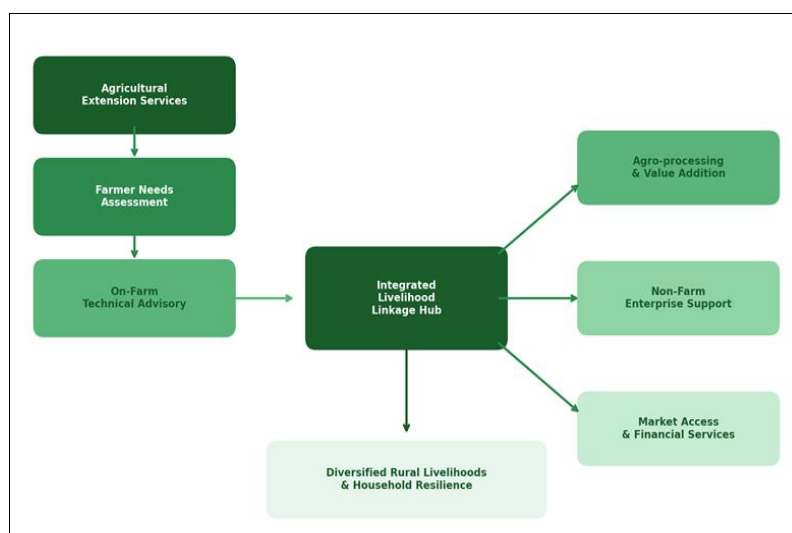


Fig 2: Pathway model for extension-mediated linkage between agricultural advisory and non-farm livelihood support systems

Comprehensive interpretation

The differences between farmers receiving diversified extension advisory and those receiving conventional agricultural advice were striking across all measured indicators (Table 1). Over 70% of the diversified group had initiated at least one non-farm income activity, compared to under 30% in the conventional group. The income gap was equally notable, with diversified-advisory households earning an average of FJD 3,670 more per year. Women were especially responsive to the diversified approach, with nearly two-thirds of female respondents in that group managing two or more livelihood streams.

Extension officers were candid about the obstacles they faced (Table 2). Nearly nine out of ten reported lacking training in non-farm enterprise topics, and more than three-quarters noted the absence of formal connections to microfinance providers. These institutional gaps help

explain why diversified advisory has not become standard practice despite its apparent effectiveness. The pie chart (Figure 1) shows that farmers' preferences for non-farm activities were varied, suggesting that a one-size-fits-all approach to livelihood diversification would miss the mark. The pathway model (Figure 2) illustrates how extension services could function as a hub connecting farm-level advisory with broader livelihood support systems, provided the necessary institutional linkages are established.

Discussion

The findings from this research add to a growing body of evidence that extension services can do more than improve farm productivity. When agents are equipped to advice on non-farm opportunities and connected to relevant support institutions, farming households appear to respond with meaningful livelihood diversification. The 42.5 percentage

point gap in non-farm activity uptake between the two advisory groups is consistent with results from comparable programs in East Africa, where integrated extension models produced diversification rates roughly 30 to 45% higher than conventional approaches^[8, 17].

The income difference of FJD 3,670 per year deserves careful interpretation. In absolute terms, this amount represents a substantial increase for households living near the poverty line. But it doesn't tell us whether the income gain is sustainable or whether it came at the expense of farm production. Some extension officers in the focus groups expressed concern that directing farmer attention toward non-farm activities might reduce the time and effort invested in agriculture. This tension between diversification and on-farm focus has been noted in the literature and seems to be more about institutional framing than about actual farmer behavior^[18]. Most farmers in our sample didn't abandon farming; they added income streams alongside it.

The gender dimension of these results is worth highlighting. Women farmers in the diversified advisory group were nearly twice as likely as their counterparts in the conventional group to be managing multiple livelihood streams. This aligns with findings from South Asia and Sub-Saharan Africa showing that women tend to be more responsive to diversification opportunities, partly because they face greater constraints in accessing agricultural land and partly because non-farm activities often offer more flexible scheduling that accommodates caregiving responsibilities^[9, 19].

The barriers identified by extension officer's point to systemic rather than individual shortcomings. Agents can't advise on topics they haven't been trained in, and they can't make referrals to institutions they aren't connected with. These are structural issues that require policy-level responses. Interestingly, the barrier least cited by officers was farmer resistance, suggesting that demand for broader advisory services exists but supply remains constrained. The pathway model presented in Figure 2 offers a starting framework for how these institutional connections might be structured, though its practical implementation would need to be tailored to specific local contexts and governance arrangements.

Limitations

This research has several important constraints. First, the cross-sectional design captures a snapshot of livelihood outcomes at a single point in time and cannot establish causal relationships between extension advisory type and diversification behavior. Farmers who sought out diversified advisory may have been inherently more entrepreneurial than those who engaged only with conventional services. Second, the research was limited to three provinces in Viti Levu and did not include outer islands where geographic isolation, market access, and cultural factors differ considerably. Third, income data were self-reported and may be subject to recall bias, particularly for informal and irregular income sources. Fourth, the classification of farmers into advisory groups relied partly on self-reported extension contact history, which could be imprecise. Finally, the research did not track environmental sustainability indicators, leaving open the question of whether livelihood diversification placed additional pressure

on natural resources. Future research should use longitudinal designs and extend to outer island communities.

Conclusion

This research found that agricultural extension in Fiji can serve as an effective catalyst for connecting smallholder farmers with non-farm livelihood options. Farmers who received diversified advisory services were more than twice as likely to have started a non-farm income activity and earned, on average, 43.6% more per year than those receiving conventional agricultural extension only. Women farmers were particularly responsive, with nearly two-thirds of female recipients managing multiple livelihood streams. These findings carry weight for a country where the majority of farming households cannot sustain themselves on agricultural income alone.

The results also expose the structural gaps that prevent extension services from routinely delivering this kind of integrated support. Extension officers themselves identified a lack of training in enterprise development, weak connections to financial service providers, and heavy existing workloads as the primary barriers. Addressing these issues requires institutional investment, not just individual effort.

What emerged from this research is a picture of extension services as a potential hub for rural livelihood support rather than a narrow channel for farming advice. The pathway model developed from these findings offers a practical framework for how extension systems might be reorganized to serve this broader function. But making this shift operational will require changes in extension curricula, performance metrics, and inter-agency coordination that go well beyond what any single research project can achieve. The evidence presented here suggests that the demand from farmers is already there. The challenge now sits with policymakers and extension administrators who must decide whether to invest in the institutional architecture needed to turn that demand into diversified, resilient rural livelihoods across Fiji and similar Pacific Island nations.

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