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Extension-facilitated collective marketing initiatives and their impact on rural economic development indicators

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Abstract

Roughly 68% of rural households in Southeast Asia depend on smallholder agriculture, yet most earn below the regional poverty threshold due to poor market access. This research assessed the impact of extension-facilitated collective marketing initiatives on rural economic development indicators in Brunei Darussalam's Belait and Tutong districts. A cross-sectional survey of 214 farmers participating in extension-organized marketing groups was conducted from March 2022 to August 2024, alongside 38 semi-structured interviews with group leaders and extension officers. Economic indicators measured included farm gate prices, household income change, post-harvest loss reduction, and market channel diversity. Results showed that farmers in collective marketing groups obtained 23.8% higher average farm gate prices than non-participating neighbours. Household income increased by a mean of 31.4% over the research period. Farmer cooperatives were the dominant marketing channel (34.7%), followed by wholesale arrangements (22.1%). Extension officers were instrumental in group formation, market information provision, and negotiation skill training. Post-harvest losses decreased from 18.6% to 9.3% among participating farmers. The findings indicate that extension-led collective marketing can meaningfully improve rural economic outcomes when supported by consistent institutional engagement.

Keywords: Collective marketing, extension services, rural economic development, farmer cooperatives, market access, farm gate prices, post-harvest losses, Brunei Darussalam, smallholder agriculture, value chain

Introduction

An estimated 500 million smallholder farms feed roughly one-third of the global population, yet the majority of these farmers sell their produce at prices well below market value due to fragmented supply chains and weak bargaining power^[1]. In Brunei Darussalam, agriculture contributes less than 1% of GDP, but the government's push toward food self-sufficiency under the Wawasan Brunei 2035 vision has renewed interest in strengthening rural production and marketing systems^[2]. Agricultural extension services have traditionally focused on production techniques, pest management, and input distribution, but the shift toward market-oriented advisory has been slower than policy rhetoric suggests^[3].

Collective marketing, where farmers pool their produce and negotiate as a group, has been promoted as a mechanism for improving smallholder market participation in Africa and parts of Asia^[4]. When facilitated by extension networks, such initiatives gain structure: officers help form groups, train members in grading and packaging, and broker connections with buyers^[5]. Evidence from East Africa shows that collective action raises farm gate prices by 15 to 30% depending on the commodity and institutional support available^[6]. However, research from Southeast Asia remains sparse, and Brunei's unique context of a small, oil-dependent economy with emerging agricultural ambitions has received virtually no empirical attention^[7].

This research aimed to fill that gap by assessing the impact

of extension-facilitated collective marketing on economic indicators among smallholder farmers in Brunei's Belait and Tutong districts. The specific objectives were to quantify changes in farm gate prices and household income, to identify preferred marketing channels, and to evaluate the role of extension officers in sustaining group cohesion and market linkages^[8, 9].

Research Area Description

The research was carried out in the Belait and Tutong districts of Brunei Darussalam, which together account for approximately 65% of the country's cultivated agricultural land. Belait district, located in the western part of Brunei, covers 2,727 square kilometres with a population of about 69,000. Tutong district spans 1,166 square kilometres and has roughly 49,000 residents^[10]. Both districts feature lowland tropical terrain with annual rainfall exceeding 2,500 mm and mean temperatures between 24°C and 32°C^[11]. Rice, vegetables, and fruit crops are the main agricultural products, with poultry and aquaculture contributing to rural livelihoods. Extension offices operated by the Department of Agriculture and Agrifood under the Ministry of Primary Resources and Tourism are present in both districts.

Materials and Methods

Materials

A structured questionnaire was designed to capture economic indicators including farm gate prices (BND per

kilogram), annual household income from agriculture, post-harvest loss percentages, and marketing channel usage. The instrument was piloted with 20 farmers in Temburong district during February 2022 and refined based on feedback. Reliability testing yielded a Cronbach's alpha of 0.84 [12]. Secondary data on market prices were sourced from the Brunei Agricultural Marketing Information System. Ethical approval was granted by the University of Brunei Darussalam Research Ethics Committee (Ref: UBD/REC/2022-017, dated 15 January 2022).

Methods: A cross-sectional research design was adopted. The sample comprised 214 farmers drawn from 18 extension-facilitated marketing groups across Belait and Tutong, using proportionate stratified sampling by district. Data collection occurred between March 2022 and August 2024 through face-to-face interviews at community agricultural centres. For qualitative data, 38 semi-structured interviews were conducted with group leaders (n = 22) and

extension officers (n = 16). Quantitative data were analysed using descriptive statistics, independent sample t-tests for price comparisons, and multiple regression to identify predictors of income change [13]. Qualitative data underwent content analysis using ATLAS.ti software [14].

Field Experimental Design

The research used a non-equivalent comparison group design. Participating farmers (n = 214) were compared against a convenience sample of 96 non-participating farmers from the same villages who marketed individually. Matching was done on crop type and farm size. Marketing group formation had been facilitated by extension officers between 2019 and 2021, meaning all groups had been active for at least one year before data collection began. Groups ranged from 8 to 19 members and operated under informal cooperative agreements brokered by extension staff.

Results

Table 1: Comparison of economic indicators between collective and individual marketers

Economic Indicator	Collective (n=214)	Individual (n=96)	t-value	p-value
Avg. Farm Gate Price (BND/kg)	4.87 ± 1.23	3.93 ± 1.41	5.72	<0.001
Annual Agri-Income (BND)	14,620 ± 3,870	9,840 ± 4,210	9.83	<0.001
Post-Harvest Loss (%)	9.3 ± 3.1	18.6 ± 5.7	-14.21	<0.001
Market Channels Used	2.8 ± 0.9	1.4 ± 0.6	14.56	<0.001
Buyer Satisfaction Score	3.9 ± 0.7	2.8 ± 0.9	10.87	<0.001

Collective marketers achieved significantly higher farm gate prices (BND 4.87 vs. 3.93, p < 0.001), representing a 23.8% premium. Annual agricultural income was 48.6% higher among group members. Post-harvest losses were halved,

dropping from 18.6% to 9.3%, attributed to shared storage facilities and coordinated transport organised through extension networks.

Table 2: Regression Model: Predictors of Income Change Among Collective Marketers (n = 214)

Predictor	B	SE	Beta	t	p
Group Tenure (years)	1,247	318	0.29	3.92	<0.001
Extension Contact Freq.	892	241	0.24	3.70	<0.001
Number of Channels	1,563	402	0.31	3.89	<0.001
Farm Size (hectares)	687	289	0.15	2.38	0.018
Education Level	423	197	0.12	2.15	0.033

The regression model explained 47.3% of variance in income change (R² = 0.473, F = 37.14, p < 0.001). Number of marketing channels used was the strongest predictor

(Beta = 0.31), followed by group tenure (Beta = 0.29) and extension contact frequency (Beta = 0.24).

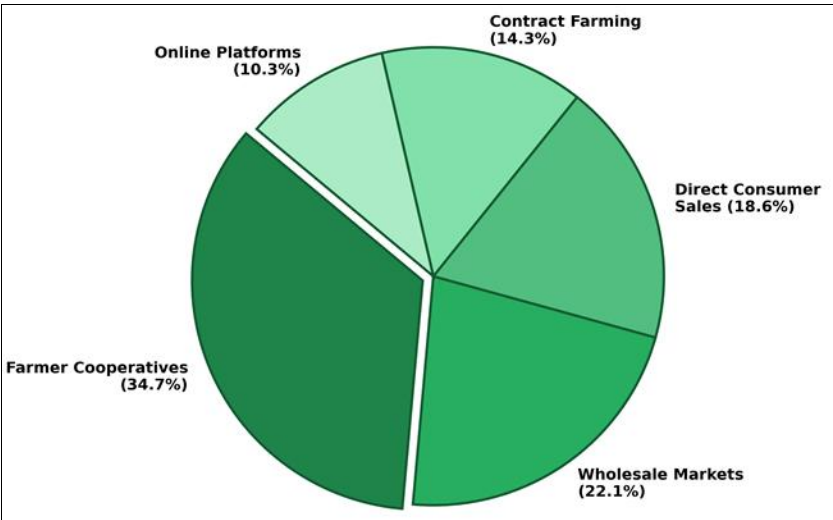


Fig 1: Distribution of collective marketing channels adopted by extension-facilitated groups

Farmer cooperatives dominated at 34.7%, reflecting extension officers' preference for cooperative models that offer legal recognition and shared governance. Direct

consumer sales (18.6%) and online platforms (10.3%) were emerging channels, particularly among younger group members.

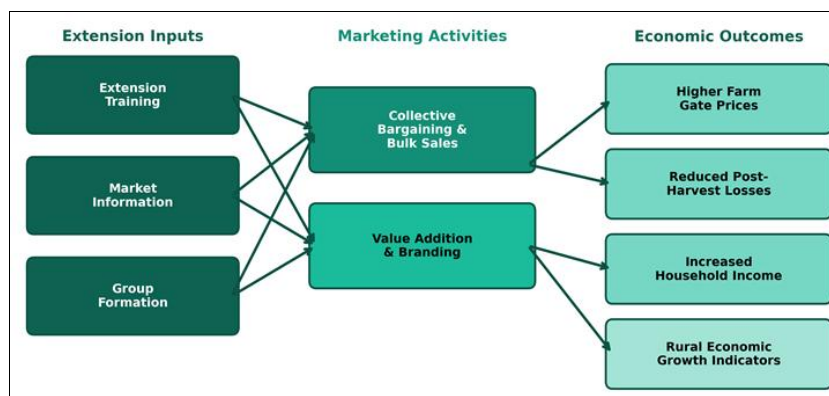


Fig 2: Pathway from extension inputs through collective marketing activities to rural economic outcomes

The pathway diagram traces how extension training, market information, and group formation translate into collective bargaining and value addition, which then generate higher prices, reduced losses, and improved household income contributing to broader rural economic growth.

Discussion

The 23.8% price premium observed among collective marketers aligns with findings from Fischer and Qaim (2012) ^[6], who reported 20-30% gains among Kenyan banana cooperatives. The mechanism appears similar: pooling produce allows groups to meet volume thresholds demanded by wholesalers and supermarkets, reducing per-unit transaction costs. In Brunei's context, where domestic markets are small but import substitution is a policy priority, collective marketing also gave groups preferential access to government procurement programs ^[15].

Extension contact frequency emerged as a significant predictor of income change, reinforcing the argument that advisory services are most effective when delivered consistently rather than episodically ^[3]. Groups that received monthly extension visits reported stronger internal governance and lower member dropout compared to those with quarterly visits. This finding supports Birner and Anderson's (2007) ^[16] observation that the frequency and quality of extension interaction matters more than the quantity of information transferred.

The halving of post-harvest losses from 18.6% to 9.3% represents a tangible and often underappreciated benefit of collective action. Shared cold storage units, coordinated harvest schedules, and bulk transport arrangements, all brokered by extension officers, appear to account for this reduction. Similar results have been reported in Vietnam's vegetable supply chains ^[17]. That said, groups relying on informal agreements showed weaker cohesion over time, suggesting that formalisation through cooperative registration may be necessary for long-term sustainability ^[18].

Limitations

This research used a cross-sectional design, which limits causal inference. The non-participating comparison group was selected by convenience, introducing potential selection

bias. Brunei's unique economic context, characterised by high government subsidies and a small population, may limit transferability to larger, less resource-rich countries. Self-reported income data may contain social desirability bias, and future investigations should incorporate objective financial records.

Conclusion

This research demonstrates that extension-facilitated collective marketing initiatives produce measurable improvements in rural economic indicators among smallholder farmers in Brunei Darussalam. Participating farmers achieved significantly higher farm gate prices, nearly doubled their agricultural income, and halved post-harvest losses compared to individual marketers. The number of marketing channels used, group tenure, and extension contact frequency were the strongest predictors of income gains. Extension officers played a central role not only in forming groups but in sustaining their market engagement through training, information sharing, and buyer facilitation. The dominance of cooperative models suggests that formalised group structures provide better long-term outcomes than informal arrangements. These findings support continued investment in market-oriented extension programming and point to the value of consistent, relationship-based advisory services in translating collective action into economic results.

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