

Adaptation approaches in cashew nut cooperative management in Benin: Lessons from agricultural cooperative applying sufficiency economy philosophy in Thailand

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ABSTRACT: This study explored adaptation strategies for cashew nut cooperatives in Djougou, Benin, using Thailand's Sufficiency Economy Philosophy (SEP) as a model, drawing insights from the cooperative in Tha Pla, Uttaradit, Thailand. Data from each cooperative were collected from five groups, with a total of 30 farmers in each cooperative. Questionnaires, surveys, and interviews focused on socio-demographic factors, cooperative structures, resource management, and the impact of SEP principles. Quantitative analysis revealed significant differences: the cooperative in Tha Pla, Uttaradit, comprising 90.00% women over the age of 50, demonstrated higher levels of education (100.00%) and income sufficiency (63.33%), alongside higher productivity (>400 kg/ha). In contrast, the Beninese cooperative, primarily male-led (86.70%) with a younger membership (70.00% between 31-50 years), showed lower education levels (66.67% illiteracy), income sufficiency (6.67%), and lower productivity (<400 kg/ha). The Thai cooperative demonstrated stronger management practices, achieving maximum scores of 16.00 in both material and financial management (16.00 vs. 12.00) and member services (16.00 vs. 11.00), highlighting more effective organizational functioning in Thailand. The overall satisfaction score of the cooperative services in Thailand was significantly higher than in Benin (3.71 ± 0.50 vs. 3.10 ± 0.30 ; t-test 16.18, $P < 0.01$). Addressing gaps in gender inclusivity, service provision, resource management, community development, and governance through SEP-driven strategies could significantly enhance the effectiveness and sustainability of Beninese cooperatives, following Thailand's model. Given SEP's success in Thailand, this study suggested that Benin consider adapting SEP principles or developing a similar framework to address these persistent challenges.

Keywords: cashew nut; agricultural cooperative; adaptation approaches; Thailand; Benin

Introduction

Agricultural cooperatives are pivotal for fostering economic development and improving livelihoods in developing countries. In Benin, where agriculture accounted for 40% of GDP and employed over 70% of the labor force, cooperatives played a key role in cashew nut production, a major export. Despite exporting over 50,000 metric tons of cashew nuts in 2021 (Arise, 2023), Benin's cooperatives faced challenges, including inadequate training,

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organizational inefficiencies, and limited market knowledge, which constrain their growth potential (Houessou et al. (2019).

In contrast, Thailand produces approximately 24,000 metric tons of cashew nuts annually, with the district of Tha Pla in Uttaradit province serving as one of the major cashew-producing regions (Pathaveerat et al. (2024). According to Suwanmanee et al. (2020), in Thapla district, 112 hectares of arable land are cultivated by 40 farmers with around 45 cashew trees planted per rai, yielding an average of 20 kg of raw nuts per tree annually. Thailand has developed a robust cooperative system supported by government initiatives. Seneerattanaprayul and Gan (2021) highlighted the crucial role of Agricultural Cooperative (AC) services in enhancing household welfare. Both AC credit and marketing services positively impact household and farm income; however, AC marketing services have shown to be more effective in supporting household welfare than AC credit. Thai cooperatives provided smallholder farmers' access to credit, markets, and technical assistance, fostering financial resilience and income diversification. The Sufficiency Economy Philosophy (SEP) emphasizes moderation, reasonableness, and self-reliance to support sustainable development. In Thailand, SEP has strengthened cooperative management by enhancing productivity, governance, and financial practices (Faysse and Onsamran, 2018). SEP has also been applied in over 20 countries, including in agricultural development in Bhutan and Tonga, as well as in sustainable tourism in Mongolia. In Bhutan, the project 'Sustainable Community Development Model based on the Application of Sufficiency Economy Philosophy (SEP) for OGOP Villages' (OGOP Model II) has been successfully implemented (Queen's Project Office, 2022).

The purpose of this study was to derive lessons from the implementation of the SEP within AC in Thailand. These lessons informed the development of proposed adaptation strategies for cashew nut cooperatives in Benin.

Materials and methods

Population and sample

The study's participants consisted of cashew nut farmers from Tha Pla, Uttaradit District, Chiang Mai, Thailand, and Djougou District, Republic of Benin. In Uttaradit, the cooperative is composed of 36 groups of regular member producers, totaling approximately 1,821 producers, and 19 groups of non-regular member producers, with approximately 1,688 producers. In Djougou, the commune consisted of approximately 1,940 member producers, of whom 831 were organic producers, organized into 56 groups. A purposive sampling method was employed to select five farmer groups from each country. In each country, a systematic sampling approach was used to select 30 cashew producers (6 farmers/producer group) who were members of the cooperative board. An officer from the cooperative served as an advisor and was interviewed to confirm the information provided by the farmers.

Tools and Data Collection

Data were gathered using a comparative approach through surveys and interviews conducted in Tha Pla, Uttaradit, Thailand, and Djougou, Benin, between June and August 2024. The data included socio-demographic factors, cooperative structure, resource management, service provision, and SEP implementation. The primary data collection instrument was a structured questionnaire, supplemented by interviews to provide qualitative insights

into participants' experiences. This mixed-method approach offered a comprehensive understanding of the cooperatives in both countries. In Benin, data collection was conducted using Google Forms, which were distributed to agricultural advisors who, in turn, interviewed the farmers and recorded on their behalf. This approach was necessary to accommodate farmers' limited literacy levels, ensuring accurate and efficient data collection.

The research protocol received approval from the Institutional Review Board of Chiang Mai Rajabhat University, Thailand, under an Exemption Review process, in compliance with international ethical standards and relevant national laws and regulations. The certificate number issued is IRBCMRU 2024/216.30.05.

Data Analysis

Qualitative data obtained from interviews, observations, and literature reviews were analyzed through content analysis and cross-tabulation to identify key themes and patterns. Quantitative data from questionnaires were analyzed using descriptive statistics, including frequency, percentage, mean, and standard deviation. Responses were measured on a Likert scale ranging from 1 to 5, categorized as follows: 4.21–5.00 (Most benefit), 3.41–4.20 (More benefit), 2.61–3.40 (Moderate benefit), 1.81–2.60 (Less benefit), and 1.00–1.80 (Least benefit). Inferential statistical methods, including Fisher's exact test and t-tests, were applied to analyze differences between the two countries, with significance levels set at 0.05 and 0.01.

Results

Comparison of Socio-Demographic Factors, Income Sufficiency, and Cashew Nut Yield between Cooperatives in Tha Pla, Uttaradit, Thailand and Djougou, Benin

This study examined key demographic, educational, and socioeconomic variables between cooperative members in Tha Pla, Uttaradit, Thailand, and Djougou, Benin (**Table 1**). The findings revealed significant differences. In Tha Pla, 90.00% of participants were female, while in Djougou, 86.70% were male, indicating gender-based roles in cooperative management. The age distribution also varied, with 66.70% in Tha Pla aged over 50 years, while 70.00% of participants in Djougou were aged 31-50. Education levels varied significantly, with 100.00% of participants in Tha Pla having some form of education, compared to a 66.67% illiteracy rate in Djougou. Income sufficiency was higher in Tha Pla, where 63.33% of participants reported sufficient income, as opposed to 93.33% in Djougou who reported insufficient income. Cashew nuts yields were also higher in Tha Pla, with 56.67% of farmers harvesting over 400 kg/ha, while 83.33% of farmers in Djougou harvested less than this amount. These findings highlighted the need for tailored interventions to improve productivity and socioeconomic conditions in both regions.

Table 1 Socio-Demographic and Agricultural Variables between Cooperatives in Tha Pla, Uttaradit, Thailand and Djougou, Benin (n=30 for each country)

Questions/Variables		Tha Pla Uttaradit (Thailand)		Djougou (Benin)	
	Component	Freq	Percent	Freq	Percent
Gender	Male	3	10.00	26	86.70
	Female	27	90.00	4	13.30
Age	Less than 30 years old	1	3.33	1	3.33
	31 – 50 years old	9	30.00	21	70.00
	More than 50 years old	20	66.70	8	26.70
Education	Illiterate	0	0.00	20	66.67
	Educated (primary school and beyond)	30	100.00	10	33.33
Income Sufficiency	Yes	19	63.30	2	6.70
	No	11	36.70	28	93.30
Cashew Nut	Less than 400 kg/ha	13	43.33	25	83.33
Quantity Harvested	More than 400 kg/ha	17	56.67	5	16.67

The services provided by cooperatives in Tha Pla, Uttaradit, Thailand, and Djougou, Benin, were presented in **Table 2**. In Thailand, the cashew nut cooperative was well-organized, with most members having over 10 years of involvement. Women played a crucial role in leadership and product diversification contributing to a wide range of cashew nut products, including fried, roasted, and seasoned varieties such as Tom Yum, paprika, and seaweed flavors. The Thai cooperative also provided extensive services that were highly significant ($P < 0.01$), including the collection of farm products, provision of agricultural inputs, credit, technical assistance, market information, handling of farm products, and advocacy/lobbying with policymakers. In contrast, Beninese cashew nut cooperative struggled with governance and member participation, with most members having shorter tenures (0-5 years), which negatively impacted both productivity and engagement. Their service offerings were more limited compared to those in Thailand. These differences in governance, product diversification, and service provision contributed to variations in productivity and member satisfaction between the two countries

Table 2 Services Provided by Cooperatives in Tha Pla, Uttaradit, Thailand and Djougou, Benin

Service	Tha Pla, Uttaradit, Thailand	Djougou, Benin	Fisher's Exact Test
Collecting farm products (including transportation)	76.70%	6.70%	P < 0.01
Selling farm products (including bargaining with buyers)	83.30%	86.70%	P > 0.05(NS)
Storing farm products	83.30%	63.30%	P > 0.05 (NS)
Providing agricultural inputs	80.00%	3.30%	P < 0.01
Providing credit	73.30%	20.00%	P < 0.01
Providing technical assistance	66.70%	40.00%	P < 0.01
Providing market information	70.00%	6.70%	P < 0.01
Handling farm products (e.g., processing, sorting, grading)	73.30%	6.70%	P < 0.01
Advocacy/lobbying with policymakers	46.70%	10.00%	P < 0.01

The services provided by cooperatives significantly contributed to member satisfaction, a key indicator of cooperative management effectiveness. Survey data showed that Thai farmers expressed higher overall satisfaction with their cooperative compared to Beninese farmers. Specifically, Thai farmers reported higher satisfaction with aspects including product pricing, government support, and participation in decision-making processes. In **Table 3**, the overall satisfaction score in Thailand was significantly higher than in Benin (3.71 ± 0.50 vs. 3.10 ± 0.30 ; t-test 16.18, $P < 0.01$).

Table 3 Farmers' Satisfaction Levels in Tha Pla, Uttaradit, Thailand and Djougou, Benin Cooperatives

Variables	Thailand ($\bar{X} \pm SD$)	Benin ($\bar{X} \pm SD$)	t-test	P-Value
Satisfaction with the price offered for products	3.53 ± 0.57	2.90 ± 0.30	14.13	$P < 0.01$
Satisfaction with different committees' performance	3.87 ± 0.57	3.33 ± 0.54	17.09	$P < 0.01$
Satisfaction with members' participation in decision-making	3.80 ± 0.55	3.33 ± 0.48	17.80	$P < 0.01$
Satisfaction with government support policy	3.67 ± 0.66	2.83 ± 0.46	12.51	$P < 0.01$
Overall Satisfaction	3.71 ± 0.50	3.10 ± 0.30	16.18	$P < 0.01$

The comparative assessment of management practices in cashew nut cooperatives in both communities was conducted using group decision-making (**Figure 1**). The Uttaradit Cooperative in Thailand demonstrated superior

overall effectiveness, particularly in the managing of material and financial resources and in providing member services. The Uttaradit Cooperative consistently outperformed Djougou, Benin's cooperative, with higher scores in material and financial management (16.00 vs. 12.00) and member services (16.00 vs. 11.00). These results highlight stronger organizational functioning in Thailand and underscore critical areas for improvement in Benin.

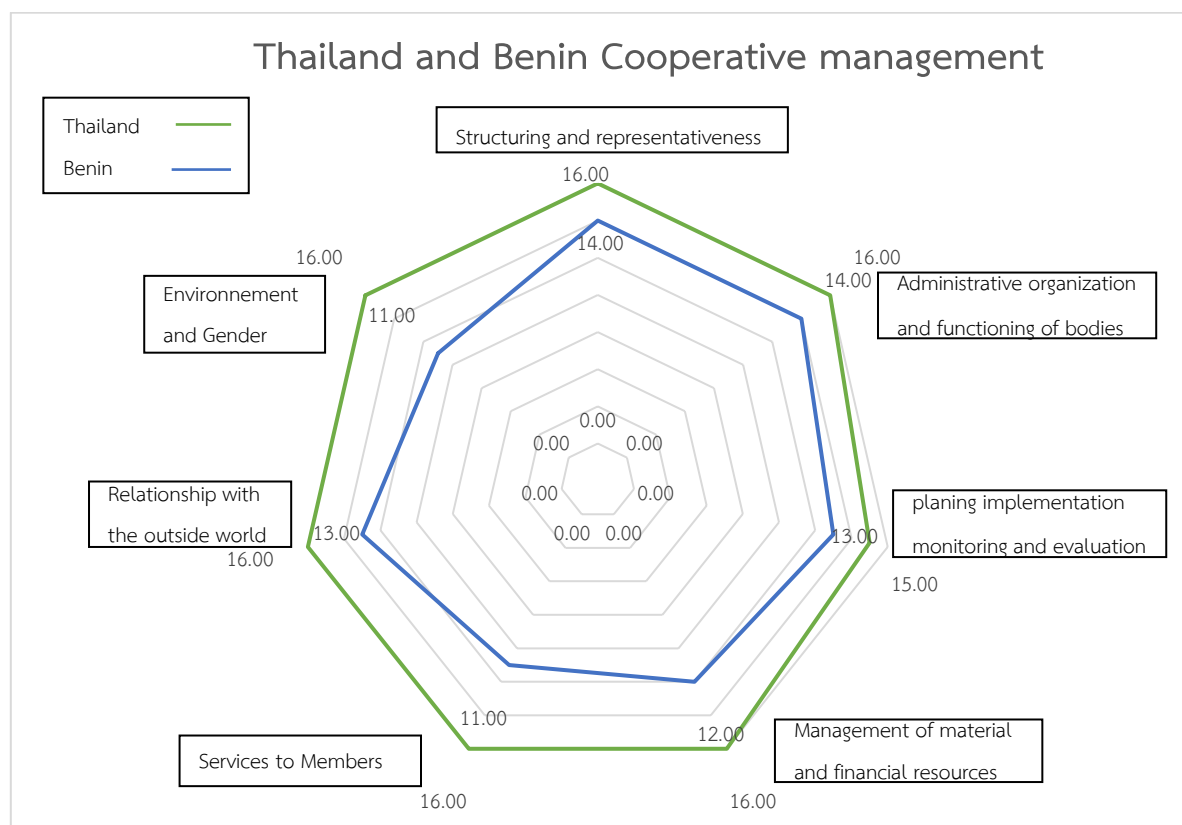


Figure 1 Management Practices Radar Chart in Tha Pla, Uttaradit, Thailand and Djougou, Benin Cooperatives.

Implementation and Impact of SEP in Tha Pla, Uttaradit Cooperative, Thailand

The Sufficiency Economy Philosophy (SEP) played a vital role in the success of Thai cooperative, enhancing governance, resource management, and financial sustainability. In this study, the cooperative in Tha Pla, Uttaradit effectively applied SEP principles, which contributed to improvements in financial management, sustainable resource utilization, and community-driven decision-making. On a Likert scale with a maximum score of 5, the overall SEP implementation score in Tha Pla averaged 3.91 ± 0.15 , indicating a high level of adoption. Among SEP components, knowledge was the least adopted, with an average score of 3.33 ± 0.21 , suggesting an opportunity for improvement in knowledge-sharing. Morality was the most applied concept (4.25 ± 0.17), followed by moderation (4.15 ± 0.33), self-immunity (4.07 ± 0.22), and reasonableness (3.86 ± 0.35), reflecting a strong commitment to ethical conduct and good governance.

The study also revealed a significant improvement in the perception of quality-of-life following SEP implementation in Tha Pla, Uttaradit (2.99 ± 0.03 to 3.81 ± 0.17 , $t\text{-test}=4.436$, $P < 0.01$), with substantial advancements observed in financial management, family relationships, marketing, and environmental management

(Table 4). Thai cooperative, aligned with SEP, offered key services, including credit, technical assistance, and market access, fostering self-sufficiency and community well-being. SEP also promoted gender participation, with women taking on leadership roles. Tha Pla Cooperative exhibited higher productivity levels (>400 kg/ha) and an average annual income of \$1,116.44, compared to the cooperative in Djougou, Benin, which showed lower productivity (<400kg/ha) and an average income of \$795.94 per year.

Table 4 Benefit and perception of quality of life in Tha Pla, Uttaradit, Thailand Cooperative

Variables	Before		After		t-test	P-Value
	$\bar{X} \pm SD$	Meaning	$\bar{X} \pm SD$	Meaning		
Social and culture	3.13 \pm 0.33	Moderate benefit	3.77 \pm 0.97	More benefit	3.159	P <0.01
Cashew production	2.98 \pm 0.26	Moderate benefit	3.67 \pm 0.93	More benefit	3.622	P <0.01
Marketing	3.01 \pm 0.14	Moderate benefit	3.92 \pm 0.96	More benefit	5.017	P <0.01
Financial resources	2.90 \pm 0.23	Moderate benefit	3.84 \pm 0.97	More benefit	5.233	P <0.01
Environmental and natural resources	2.99 \pm 0.21	Moderate benefit	3.72 \pm 0.97	More benefit	3.825	P <0.01
Producers conduct in the society	3.01 \pm 0.20	Moderate benefit	3.91 \pm 0.98	More benefit	5.000	P <0.01
Overall benefit/perception of quality of life	2.99 \pm 0.03	Moderate benefit	3.81\pm 0.17	More benefit	4.436	P <0.01

Note: 4.21-5.00: Most benefit, 3.41-4.20: More benefit, 2.61-3.40: Moderate benefit, 1.81-2.60: Less benefit, 1.00-1.80: Least benefit

Discussion and recommendations

The study revealed distinct differences in the management practices of cashew nut cooperative in Thailand and Benin, shaped by local governance structures, member participation, and service provision. Several key gaps were identified between the two countries' cooperatives, with SEP-driven strategies proposed to improve Benin's cooperative.

Gender Inclusivity Gaps

A significant gender gap was observed between cooperative in Thailand and Benin. In Thailand, women played a key role in leadership and product diversification, particularly in the development of value-added cashew products, including fried, roasted, and flavored varieties such as Tom Yum, paprika, and seaweed (Phanthiam and Taeporamaysamai, 2019). Thai cooperative also provided extensive services, including market access, technical

assistance, and financial support, which empower members and foster inclusive participation. In contrast, Beninese cooperative exhibited lower levels of female participation in leadership and decision-making roles. Despite laws aimed at improving women's rights in Benin (United Nations, 2018), cultural and economic barriers persist, limiting their safety, security, and participation. Women's access to essential resources, such as land, remains constrained, and male dominance in decision-making undermines their authority (Kinkingninhoun-Méda et al., 2008). These challenges hinder gender equality and women's economic empowerment in Benin. Adopting gender-inclusive policies, modeled after Thailand's approach, could enhance operational efficiency and decision-making in Benin's cooperative.

Service Provision Gaps

Beninese cooperative provided fewer services compared to their Thai counterparts, which offered key services such as credit access, technical assistance, and market information. Expanding the range of services available in Benin, particularly in credit and technical support, and applying SEP's self-reliance principles, as exemplified by Thailand's Bank for Agriculture and Agricultural Cooperative (BAAC) model (Poramacom, 2000), could improve member satisfaction and productivity. Cooperative in Benin often struggle with limited access to financial resources due to underdeveloped financial infrastructure in rural areas, lack of collateral, and limited credit histories. Ibikoule and Godonou (2024) found that access to credit varies significantly across Benin, with the issue being most severe in the North, where many farmers struggle to obtain credit. According to Sarapirom and Sarkar (2018), the SEP aligns with the Sustainable Development Goals (SDGs), aiming to eradicate poverty and reduce inequality as key components of sustainable development.

Resource Management Gaps

Resource management in Beninese cashew nut cooperative was observed to be less efficient compared to those in Thailand, where the SEP promoted sustainable farming and resource use (Samakkarn and Jiraudomsarod, 2024). Implementing training programs for Beninese cashew nut cooperative members in sustainable farming and resource management, drawing from Thailand's SEP-based models, including the Integrated Agricultural Economic Model (Wongkumchai and Kiattisin, 2021), could significantly improve productivity and sustainability in Benin. Prasertsri et al. (2016) found that cashew nut farmers in southern Thailand adjusted their farming practices based on weather patterns, soil quality, and local market demands, creating context-specific solutions for their specific environments rather than following a one-size-fits-all industrial approach. Additionally, Song (2020) documented the impact of SEP-driven knowledge-sharing programs that introduced natural pest control methods to Thai cashew nut farming communities. Farmers were trained to utilize local resources, such as neem oil and other natural pesticides, thereby reducing reliance on chemical inputs. These ethical farming practices, which prioritize environmental and social well-being over short-term profits, are central to the SEP approach.

Community-driven Development Gaps

Low participation and trust were common challenges in Beninese cooperative, whereas Thai cooperative, guided SEP, fostered community well-being and collective decision-making (Prabripu and Wiboonpongse, 2021). Implementing similar community-driven strategies in Benin could strengthen member engagement and improve cooperative effectiveness. Dhirathiti (2017) noted that His Late Majesty King Bhumibol Adulyadej envisioned a society where Thai people, particularly policymakers, were "determined to preserve the community so that we are able to

enjoy this reasonable way of life." Sarapirom and Sarkar (2018) suggested that the SEP represented a conscious choice that has emerged by the people, for the people, with the collective benefit in mind. Adopting SEP principles in Beninese cooperative, particularly the emphasis on morality and social responsibility, could foster greater trust in leadership, thus enhancing cooperative membership and participation. Awoke (2014) found that trust plays a crucial role in the success of complex social systems, referring to the willingness of individuals within a group to rely on one another.

Governance and Leadership Gaps

This section addresses the level of satisfaction among cooperative members regarding governance practices. The findings revealed a significant disparity in satisfaction levels between the two regions (**Table 3**). Governance challenges, particularly those arising from leadership practices within the cooperative, remain unresolved in Benin. Tama-Imorou and Wennink (2007) found that the services directly provided by the Association of Benin Cashew Producer's Cooperative (ACooBéPA) were limited to connecting members with buyers, negotiating prices, and contracting sales agreements. Similarly, Ibikoule et al. (2024) reported that the decline of Maize Producers Cooperative (MPC) in Kandi, Benin, was largely caused by limited services for members. Manne et al. (2021) further highlighted that the current period, marked by the implementation of Uniform Act on Cooperative Society Law (USCOOP) was preceded by three major phases during which the quality governance has deteriorated and social justice has remained weak. Ibikoule et al. (2024) found that the reason of demising from MPC was the poor internal governance marked by the shortfall in expertise. Leadership training programs focused on transparency and inclusive decision-making, modeled after Thailand's SEP principles, could enhance governance and improve cooperative performance in Benin.

Addressing these gaps in gender inclusivity, service provision, resource management, community-driven development, and governance through SEP-based strategies could significantly enhance the effectiveness and sustainability of Beninese cooperative, following Thailand's model.

Conclusion

The Sufficiency Economy Philosophy (SEP), implemented by cooperative producers in Thailand, has demonstrated effectiveness as a tool for sustainable development. This approach, which has gained international adoption, fosters positive impacts across multiple dimensions of human well-being. By emphasizing moderation, reasonableness, and risk management, SEP contributes to both economic and social resilience, promoting sustainable growth that is adaptable to diverse contexts and beneficial for communities worldwide. Thai cooperative leaders, acknowledging socio-economic and environmental challenges, have adopted King Rama IX's Sufficiency Economy Philosophy (SEP). This philosophy has driven improvements across various sectors, notably in agriculture, enhancing both the quality of life and productivity of cooperative members. Given the proven effectiveness of SEP in Thailand, it would be worthwhile for the Beninese government to consider adapting this model or developing a similar approach, in collaboration with experts, to address the challenges faced by cooperative in Benin.

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