

A Case Study on Strengthening Food Security and Agribusiness Innovation by Implementing the Saambat Project in Cambodia

Dongqi Shi¹, Adhita Sri Prabakusuma² and Hadi Yahya Saleh Mareeh³

¹Department of International Exchange & Cooperation, Yunnan Agricultural University, Kunming, China

²Department of Food Technology, Universitas Ahmad Dahlan, Yogyakarta, Indonesia

²College of Food Science and Technology, Yunnan Agricultural University, Kunming, China

³College of Agricultural Economics and Management, Yunnan Agricultural University, Kunming, China

Keywords: Food Security, Agribusiness Innovation, SAMBAAT, Cambodia.

Abstract: In Cambodia, the government still faces agricultural productivity, labour competency, and climate change susceptibility problems. The government and the International Fund for Agriculture Development (IFAD) have initiated a Sustainable Asset for Agricultural Market, Business, and Trade (SAAMBAT) collaboration project. However, limited studies were observed about the project. A desk study using multiple data resources and project reports was performed to investigate the practical implementation of SAMBAAT in Cambodia. The data were available online and retrieved from the Cambodian government, ADB, IFAD, and The World Bank. The expert acquisition was also conducted by confirming the analysis and findings to professional third parties involving in the project monitoring. After the project was implemented, the local farmers started diversifying their value-added crops and operating their farming system by following Good Agricultural Practices (GAP) standards. Besides, they could also adopt new innovative technologies to increase agricultural productivity, improving national food security establishment, and using digital apps to support their agribusiness sustainability, such as an e-agriculture platform developed by trained local youth. SAAMBAT is recommended to encourage the Techno Start-Up Center (TSC) to develop its organizational capability and business model to boost the digital economy's innovation, specifically to support rural agribusiness growth. Further improvement and evaluation are required to maintain the process and enlarge the project's impacts.

1 INTRODUCTION

In 2019, Cambodia's economic growth had been reported to reach the highest average rate over the last two decades by achieving 7.7% per annum. This impressive achievement was significant evidence of active collaboration between the government and all strategic stakeholders to develop political stability and macroeconomic growth. The government also succeeded in creating a lively business atmosphere in domestic and international partnerships. In this accomplishment, agriculture is one of the dominant sectors which have rapid and robust growth. Economic growth has been supported mostly by the manufacturing and services sectors, but agriculture provides nearly half of the employment share and advantages. The agricultural sector also plays an essential role in providing livelihood resources in rural development, strengthening food security,

alleviating poverty, and supports the food security system. From 2014 to 2019, the Cambodian government has excessively created programs to support agricultural development, such as increasing cultivation land, promoting domestic agricultural products to the global market, improving the regional relation with neighbouring cross-border countries, adopting new innovative technology, strengthening foreign direct investment policy, and inviting stakeholders to work together in Cambodia (The World Bank, 2019).

By 2019, Cambodia's total population was calculated at 16.3 million, with a growth rate of 1.46% per year. Cambodian people mostly live in rural areas, accounting for 76.195% of the total population (The World Bank, 2019). More than 50% of the total population inhabiting the central plains, and approximately 30% of them settle surrounding the Tonle Sap Lake. Since 2014, Cambodia has made

a remarkable history of decreasing poverty to 13.5%. From 2004-2015, four million people have been upraised from the poverty line, and nearly 60% of the total poverty was alleviated due to the improvement of the agricultural sector and food security establishment (ADB, 2017). However, a large part of rural families remains vulnerable to necessitous. Previously, according to the National Bank of Cambodia's report, the average growth rate of the agricultural sector contributed 3.7-4.5% per annum during 2008-2013 (Lao, 2019). Nevertheless, it has decreased to 0.3% by 2014, 0.2% by 2015, and 1.4% by 2016 (ADB, 2018). Furthermore, compared to the agricultural sector's GDP in the 1990s, which shared 46.0% of total GDP, it fell to 26.6% in 2015 and continued to decrease to 21% by 2019 (The World Bank, 2019). Even though the agricultural sector has been slowing down, it is necessary to increase the annual growth rate at an average of 5% until 2030 to maintain the domestic economy's sustainability.

In this Covid-19 pandemic, the annual rate of the agricultural sector has been predicted to diminish also. Thus, the government should concern about keeping the economy remain to sustainable. Moreover, Cambodia still faces many kinds of significant social and natural problems. Recently, the productivity of labour in the agricultural sector remains low. The system of supply chains is still unconnected, costly, and inefficient to use energy. The transportation networks are underdeveloped, with only around 2,000 km hard-paved of 45,000 main roads in the rural area. Most small and medium agricultural enterprises have inadequacy to grow, and not more than 2% of youth acquire technical education and vocational training. To date, Cambodia is also susceptible to climate change and global warming, not only in Southeastern Asia but also globally (Yusuf & Fransisco, 2009). During 1996 – 2015, the world's extreme weather phenomenon affected most countries' climate risk index ranks also dramatically changed, and Cambodia is ranked 13th among 181 countries (Kreft & Eckstein, 2016). Local farmers in Cambodia could not predict the rising temperature precisely (Thomas, et al., 2013). Therefore, when the climate changes, their farming relies on rain-fed is directly affected by floods or droughts. Climate change has also impacted the reared livestock morbidity and directly influences the national food security level (Arias, et al., 2012; Mbow, et al., 2019).

Since 2019, the government, in collaboration with the International Fund for Agriculture Development (IFAD), has been trying to initiate a sustainable program to address these challenges, as mentioned above. IFAD is a specialized agency under the United

Nations and an international funding organization committed to alleviating poverty and lack of food and nutrition in rural areas of third world countries. IFAD started their projects in 1996 and ran the national ten programs during its dedication to Cambodia. They have invested more than USD 256 million to nurture local people up to 2019 and currently share benefits with more than 1.5 million families. Recently, IFAD supports the government in implementing a new 5-years program in 2020, known as the Sustainable Asset for Agricultural Market, Business, and Trade project (SAAMBAT). In the initial work, five parts fund this project, IFAD budgets a total loan of USD 53.2 million and a grant of USD 1.2 million. The Royal Government of Cambodia (RGC) counterparts provide USD 11.3 million. Food and Agricultural Organization (FAO) of the United Nations also contributes a co-financing of USD 300 thousand in the technical cooperation format. Besides, the RGC, as a beneficiary, is required to prepare financial support in a total of USD 144 thousand and about USD 1.1 million for national budget expenditures to maintain the project's sustainability (IFAD, 2020). Afterwards, IFAD will evaluate the performance to decide the continuity of the project. A total of USD 25.2 will be provided as a funding gap in the next performance-based allocation system (PBAS) cycle when a positive result is presented.

The goals of SAAMBAT are designed to boost the potential productivity of rural youth, strengthen the local agricultural enterprises, and accelerate the rural economy to achieve the targeted growth of food security establishments. SAAMBAT supports the local government in increasing infrastructural development and renewable energy, particularly to resilience climate change. Climate change adaptation is one of the concerned focuses and established in all aspects, starting from the mitigation process, preventing the adverse effects, and preparing to reduce greenhouse gas emissions (GHG) [(Arbuckle, et al., 2015), (Demski, et al., 2017)]. The project dynamically empowers rural women to be involved in the social process and involves the youth to drive social change in creating agricultural economic opportunities. The project also has an investment budget for building rural youth's capacity in entrepreneurship and vocational skills. Thus, rural youth could adapt the globalization and utilize the local resources to create beneficial opportunities. However, limited studies learned about the performance and effectiveness of the project. Therefore, this current study aimed to investigate the practical implementation of SAMBAAT in Cambodia using multiple data resources and project reports.

2 MATERIALS AND METHODS

Reviewing the innovation process in an agricultural development, specifically complicated structures such as rural agricultural system dynamics to support food security establishment, is exceptionally challenging, primarily when the multiple stakeholders, sub-systems, and various players are involved. To determine the degree of agricultural innovation development, a literature review was conducted, along with an evaluation of the program in agricultural extension within the current growth of the SAMBAAT project. Besides, an agricultural policy study was done to complete the investigation. A descriptive analysis was performed explaining the phenomena from its perspective. This review is often explanatory; for example, it seeks to describe cause and effect interactions within a hypothesis (Oliveira, et al., 2019). We tried to illustrate the disparity between the planning and reality of agriculture innovation by assessing a specific case. This study was focused on a report, *Cambodia Sustainable Assets for Agriculture Markets, Business, and Trade (SAAMBAT) Project Design Report No. 2000002278* (Issue 16). To carry out the study, we enriched the information available from the following sources: *Cambodia's Agriculture Productivity: Challenges and Policy Directions*. Moreover, issues that could occur as the innovation introduction process was given particular consideration.

3 RESULTS

3.1 The Technical Strategies of the SAMBAAT Project in Cambodia

The SAAMBAT project is nationally approaching in 50 Economic Poles (EP) in the food security program establishment. The EP mainly consists of potential agricultural production areas, selected food commodities focused by Agriculture Services for Innovation, Resilience, and Extension (ASPIRE) project, and covering 20 of the 25 provinces in Cambodia supported by the Accelerating Inclusive Markets for Smallholders (AIMS) project. ASPIRE (project period of 2015-2021) and AIMS (project period of 2016-2022) has been funded by IFAD loan finance with a total project cost of USD 94.52 million and USD 61.61 million, respectively. In 2019 as an initial project work, known as Phase 1, IFAD and RGC have selected and prioritized 10 EP from 5 provinces, including Battambang, Kampong Cham,

and Kampong Chhnang, Kandal, and Svay Rieng (IFAD, 2019). This initial selection is based on an evaluation of the stakeholder's agricultural production process. The evaluation method refers to the specific potential to support agricultural growth acceleration, the need for infrastructure facilities, firm commitment to grow up and the local leadership capacity, level of poverty, level of outward labour migration in particular by youth (FAO, 2014).

Moreover, another essential priority background is a significant vegetable value chain in some areas. In 2020 and 2021, known as Phase 2, another 15 EPs are undergoing to select. At the end of 2022, as a SAAMBAT project mid-term evaluation, a final of 25 EP must be accomplished to short-list thoroughly. The concept of EP is outlined in Fig. 1 as follows.

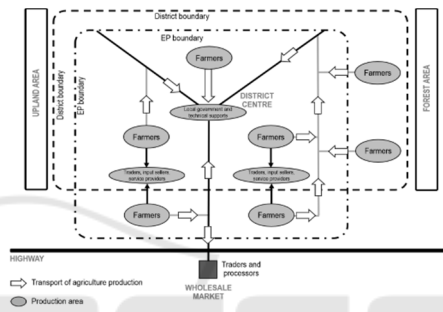


Figure 1. Concept of Economic Pole (EP) location of the SAAMBAT project. All EPs have ASPIRE or AIMS projects (or both) and main rural roads to support agricultural development and agribusiness value-chain to strengthen food security establishment. Adapted from IFAD, 2019.

This selection arrangement is designed to allow the project management officers to provide feedback for all opportunities resulting from ASPIRE and AIMS elaboration. Subsequently, the process enables the officers to consider and formulate the input from partner projects' planning. The districts short-listed for Phase 1 EP consist of at least 314,000 families, with approximately 23% categorized as inferior in the economy. Low-income families suffering from multi-sector poverty are targeted groups in the EPs covered by ASPIRE and AIMS. Besides, a total of 132 Communes were selected, of which 44 are very climate-susceptible. At that Communes, about 51% of the workforce occupied the agricultural sector, with 16% employed as out-migratory labourers. Most labourers are rural youth aged 16-30, accounting for 40% of the total population. In each SAAMBAT project location, the first prioritized target groups are smallholder peasants who can reinforce market-driven production. Secondly, unemployed under-30-year rural youth from low-income families with high

motivation to look for formal occupation or upgrade their vocational soft and hard skills. Thirdly, local small and medium enterprises (SME) and rural cooperatives play significant roles in increasing value addition on key-value chains in the EPs. The online directory provides valuable information for SMEs in Cambodia that can be accessed online (MIH, 2019). Fourthly, the women group still finds a place in agriculture activities or SME sectors. This gender issue is concerned with more attention, even though it should be positioned proportionately (Doss, et al., 2017; Doss, 2018; Kristjanson, et al., 2017).

3.2 A Social Condition in SAMBAAT Project Location

The condition of the population, economic level, and social living for Phase 1 EP in five selected provinces is outlined in Table 1. Among the selected districts in Phase 1 EP, Khsach Kandal and Mouk Kampoul of Kandal Province have the highest number of Communes, 25 Communes registered. It has the highest total of targeted beneficiary families. However, Thma Koul district of Battambang Province has the most significant percentage of low-income families and seven units of CV as the highest climate-vulnerable.

Table 1. A social condition in districts selected for phase 1 EP in five provinces.

District	Communes		Families		Veg VC Clusters		Youth (%)	Migrant (%)	FHH (%)
	Total	CV	Total	Poor (%)	AIMS	ASPIRE			
1. Battambang Province									
Thma Koul	10	7	29,926	33	1	3	35	40	13
Aek Phnum	7	2	18,843	33	1	2	17	40	16
2. Kampong Cham Province									
Chamkar Leu	8	5	27,243	20	0	0	16	40	15
Kampong Siem	15	6	29,478	16	0	0	14	37	19
3. Kampong Chhnang Province									
Role Bier	13	4	25,921	30	2	3	12	40	20
Sameakki Mean Chey	9	1	19,089	31	2	1	8	42	15
4. Kandal Province									
Khsach Kandal and Mouk Kampoul	25	3	47,818	19	21	12	5	40	15
Sang	16	5	45,963	22	8	16	6	39	14
5. Svay Rieng Province									
Romeas Hayek	16	5	32,049	20	1	4	28	38	15
Svay Chrum	16	6	38,326	18	1	6	24	40	17

CV: Communes in 40% most climate-vulnerable; Veg VC: vegetable value-chain; Migrant: percentage of workforce migrating to work; FHH: percentage of female-headed families. Ministry of Economy and Finance requested to create EP from within the boundaries of Khsach Kandal and Mouk Kampoul, focusing on the communes having significant vegetable production. It was adapted from IFAD, 2019.

3.3 Project Implementation

IFAD'S SAAMBAT was designed and proposed in 2019 (Table 2). In that year, the selection of appropriately qualified service officers was accomplished to recruit. It was a necessary process to ensure and facilitate the starting-up of the project running smoothly. The project is then gradually time-lined and performed over a five-year start from the beginning of 2020 until 2025. The mid-term review has been arranged for the end of 2022. Currently, the project was running by conducting several programs planned before. However, due to the Covid-19 pandemic, these programs in the first semester period were going a little bit slower. These programs have been accelerated faster in the second semester of this current year. SAAMBAT project was strengthened by supporting stakeholders at the national and provincial levels. These stakeholders should include several agencies, including the Department of Rural Development (PDRD), ASPIRE Department of Agriculture, Forestry, and Fisheries (DAFF), AIMS Regional Hub Department of Commerce (DoC), Provincial Department of Women's Affairs, Department of Mines and Energy, chamber of Commerce, partner projects, farmer organizations, and rural cooperatives.

In the context of SAAMBAT implementation, Country Program Steering Committee, which MEF leads, will conduct a bi-annual meeting to evaluate the project's administration and realization. The high-level meeting's primary purpose is to ensure the project implementation fits the planning and standard of procedures [(ESCAP, 2020), (Inter-American Development Bank, 2010)]. Besides, it is also held to confirm all IFAD-financed programs in the country are coordinated well. Subsequently, MEF must implement Component 2 of SAAMBAT described in Table 3 (Skills, Technology, and Enterprise) through a Project Implementation Unit (MEF-PIU). MEF-PIU is technically responsible for procurement, contract management, financial management, and consolidation of reporting for the whole of Component 2. Contrariwise, to establish the implementation of Component 1 (Value Chain Infrastructure), the Project Manager is appointed the

Service Provider on Skills Development (SP1) as the specialist partner to share the knowledge through technical and vocational education and training (TVET) program. Forth, Service Provider SP2 has the essential responsibility of technical support to Sub-Component 2.1, about Skills for Rural Youth (MEF). Besides, the Service Provider on Digital Technology Outreach (SP3) is contracted to disseminate the knowledge about applicative and innovative digital technology to the smallholders in the agricultural sector to leverage the food security establishment level.

Table 2. SAAMBAT project's highlight, adapted from IFAD (2019).

Detail of project	Information
Project Name	Sustainable Assets for Agriculture Markets, Business, and Trade (SAAMBAT)
Executing Agency (EA)	Ministry of Rural Development (MRD)
Implementing Agencies (IA)	MRD, Ministry of Economy and Finance (MEF), Techo Start-Up Centre (TSC), and Centre for Policy Studies (CPS)
Start date	Jan 1, 2020
Project cost	USD 90.3 million
Project financing	IFAD loan USD 53.2 million, IFAD Grant USD 1.2 million, RGC USD 10.8 million, Funding Gap USD 30.3 million
Sectors	Agriculture and rural economic development
Themes	Rural infrastructure, rural enterprise development, skills development for local people, and improving digital technology implementation
Target area	The program activities cover many provinces in Cambodia
Targeting strategy	50 Economic Poles (EP) selected to enable the integration with ASPIRE and AIMS program approaches
Goal	Reducing poverty, enhancing food security, and increasing agricultural sustainability

Furthermore, the unit of Skills Development Fund (SDF) in the MEF General Department of Economic and Public Finance Policy is responsible for implementing Sub-Component 2.1 of SAAMBAT outlined in Table 2 (Skills for Rural Youth and Enterprise). The Techo Start-Up Centre (TSC) is responsible for implementing Sub-Component 2.2 (Digital Technology and Enterprise). Then, the Centre for Policy Studies (CPS) is appointed as an organizing partner for conducting Sub-Component 2.3 (Programme Management, Policy Research, and Strategic Studies).

Table 3. SAAMBAT project's components, outcomes, and critical results adapted from IFAD, 2019.

Component	Name / Agency	Key Results
Component 1	Value Chain Infrastructure	160,000 households report improved access to markets and economic and social services
• Outcome	Poor rural people's benefits from market participation increased.	
• Output 1.1	Rural roads (MRD)	300 km paved roads, 150 km laterite roads
• Output 1.2	Other value chain infrastructure (MRD)	50 rural market areas improved, 25 value chain logistics facilities
• Output 1.3	Water management	Not decided
Component 2	Skills, technology, and enterprise	4,500 rural youth in improved employment, 85% of supported rural enterprises reporting increased profits
• Outcome	Poor rural people's productive capacities increased (MEF)	
• Output 2.1	Skills for rural youth (MEF)	6,840 rural youth trained
• Output 2.2	Technology and enterprise (MEF/TSC)	25,000 users of digital technology in agricultural value chains

The Provincial Department of Rural Development PDRD is selected as a SAAMBAT centre of works for this purpose. As the UN's official implementing agency of SAAMBAT, IFAD creates a relationship with all relevant development partners and Farmer Organizations (FOs). Those partners and FOs will be represented on the Country Program Steering Committee. MRD takes a role as the SAAMBAT's executing agency. MRD is also responsible for initiating the establishment of the Project Management Unit (PMU). PMU has a job description that conducts project management, financial management, procurement, and Monitoring and Reporting (M & M&E). The PMU, assisted by engineering experts, has another essential work to supervise the infrastructure works. During the implementation process, the potential number of selected provinces with the SAAMBAT project will increase gradually.

The workload among the provinces is progressively varied. Furthermore, the intense activities period in each province may be relatively limited. Project facilitators are selected and responsible for developing a better work timeline and

organizing regional hub interconnectivity. At the beginning of 2020, MRD has assigned the project director and the project manager. Then, PMU has established a technical assistant team to support the routine work of project management, coordination, financial management, and procurement. PMU also created communication with UNICEF to ensure that SAAMBAT implementation will help the country to accumulate benefits from the present and future nutrition program created by UNICEF with MRD. Besides, in the context of MRD's responsibility in Value Chain Infrastructure (Component 1), MRD recruits a qualified engineering consultant company to provide technical assistance. The company provides project planning to conduct the assessment of climate vulnerability, engineering feasibility study to build public facilities, engineering design, estimation of work costs, preparation of technical works, a study of social and environmental safeguards, technical drawings, and calculating Bills of Quantities (BoQ) for tender documents and the construction supervision. These works of technical service must be reported to the Project Manager. After that, MRD assigns officers in its Provincial Departments of Rural Development for conducting several vital activities such as planning, coordination, and monitoring works at the provincial level. They should also coordinate with another project management team financed by the UN.

3.4 The Development Process in Agricultural Innovation to Strengthening Food Security

In Cambodia, small family-run farms produce most agricultural products in the land's average size is about half a hectare. This business size is unappropriated for agroindustrial farming. After the SAAMBAT project was implemented in Cambodia this year, the farmers started to diversify their value-added crops and operate their farming by following the standard of Good Agricultural Practices (GAP). The global food safety management systems such as Hazards Analysis and Critical Control Point (HACCP) or ISO 22000: 2018 should also be recommended to be implemented. Besides, the local farmers and rural youth also can adopt new innovative technology to increase agricultural productivity and implement digital apps to support their agribusiness [(Saiz-Rubio & Rovira-Mas, 2020), (USDA, 2019), (Akkoyunlu, 2013)]. For example, the SAAMBAT has been supporting an e-Agriculture Platform in Kampong Cham Province. This province is known as the centre of rice growing

in Cambodia. The platform allows farmers and buyers to create online transactions with each other. The peoples feel new exciting experiences during the implementation of the project.

Afterwards, TSC is received USD 10 million to develop the Digital Agriculture Value Chain of SAAMBAT. The funding is exciting for youth to contribute their capacity to accelerate the agricultural digital economy development. The TCS youth was trying to build an e-commerce platform with credit scoring, intelligent contracts, and training to farmers on digital skills. The app built by youth trained in TCS, such as Agribuddy, is an emerging startup that connects farmers to resources and networks. The application software is mobile and web-based, which farmers cannot use alongside a "buddy" to store data and order supplies as needed. Agribuddy provides an online facility for farmers to obtain bank loans as capital to increase their agribusiness capacity to support the national food security program. During SAAMBAT implementation, the Skills Development Fund (SDF) will be supported and focused on enlarging trainees' recruitment to rural areas, particularly rural youth from more deprived families. SAAMBAT is also driven to screen and respond to specific vocational skills training needed in rural economic development.

Moreover, it allows the provincial government to create a strategic hub of training service providers in rural areas. In the context of SDF, the SAAMBAT project also supports local beneficiaries to participate in formal training, internships, and collaboration works. During the implementation process, the soft and hard skills will be trained frequently to rural participants to create social change and economic development.

The management team prepares the appropriate materials, methods, and approaches to establishing the training process. The project management team will then accommodate the matching process between the participant's needs and the training service provider's wants (The New Partners Initiative Technical Assistance, 2009). This accommodation process considers the social condition, necessary in the field, readiness of the participants, the project's primary targets, and the training service assistants' material availability. The training service providers develop specific curricula and learning process standards to ensure the knowledge transfer is well-established to rural youth, women groups, or local farmers [(MEAS, 2005), (Hijweege, 2019), (CDC, 2013)]. These capacities are also trained by complying with the SDF's general operational methodology. This adjustment aims to

confirm the continuity of the knowledge upgrading after the project is accomplished. Besides, the training service providers also have new perspectives on running the training, adjusting the curricula, improving the participant's capacity, and continuing their work under the SDF-financed program after the SAAMBAT project is finished.

Moreover, in the last of SAAMBAT training, the participants are expected to develop the SMEs. Those SMEs are supported financially and technically by Rural Business Incubators. Previously, SMEs driven by rural youth should be trained to design a sustainable business plan, establishing the business administration, managing the capital, and creating a strategy to generate income streams for their agribusinesses sustainability in the future [(Klofsten, et al., 2019), (Valdez, 2011)]. SAAMBAT is also targeted to encourage the Techno Start-Up Center (TSC) to develop its organizational capability and business model. TSC's strategic activities research Fintech Policy Recommendation and Khmer Text Search in an extensive data set. Afterwards, conducting a project of CamDX (a unified Online Business Registration Portal), the Digital Agriculture Value Chain under SAAMBAT project, incubating startups in the country, acting as the business accelerator for youth, and developing an e-commerce model. TSC is assigned to assist the business development of digital innovation-based tenants in each stage. This work is simultaneously supported by Khmer Agricultural Suite (KAS) through its technical assistant services. On the other hand, KAS ensures the digital applications developed by TSC can be integrated into KAS. Those apps could efficiently serve rural society through synchronisation, facilitate the SMEs to generate income, support local businesses to maintain commercial works, connect stakeholders in real-time, and be fully well-operated in the long-term use.

4 DISCUSSION

The beneficiaries mainly present positive feelings and opinions regarding this project implementation. They received better experience, knowledge, network, opportunity, and guidance to increase their capacity and agribusiness level. However, this project was still running and has not been accomplished yet. Therefore, it still needs improvement and evaluation to maintain the process well-establish. At the end of next year, the government, IFAD, and stakeholders will review the project. The change resulted after the project was implemented in half of the first year,

including the infrastructure assets of the SAAMBAS project, which were underdeveloping and identified with clear ownership. The government started arranging the financial budget to maintain the routine operation to ensure agricultural sustainability and food security establishment (FAO, 2009). The government institution, rural organizations, and local stakeholders supported by the project could take innovative action to deliver their services, strengthen the function, and be aware of gender principles. The project systematically supported local agricultural SMEs and innovative youth to increase their technical capability to run their business, survive globalisation, and intensifying competitiveness.

During the implementation of SAAMBAT in 2020, IFAD had made significant participation and dedication to rural agricultural development in Cambodia. These achievements made including rural youth and women empowerment, gender equality, innovative agricultural technology dissemination, and accelerating economic growth based on rural decentralization. Nevertheless, project weaknesses were recognized, including the agricultural extension and training method, mainly when the Covid-19 outbreak broke in early 2020. The project management team could carry out a virtual extension or online training (Emeana, 2020). However, this approach's effectiveness was still questionable due to the lack of facilities and appropriate facilitators. The materials presented in online training remain limited, in particular regarding on-farm activities or practical techniques.

Furthermore, in the agricultural value chain to support the food security program, the women leaders play a significant role in many operations of the small-scale farmers, small-scale collectors, retailers, and wholesalers. These value chain sectors and women leaders' participation also require activation within the domain of local and national policies [(Sraboni, et al., 2014), (Hohenberger, 2017)]. Building a robust agricultural value chain needs more than just adapting potential innovative technologies and business partners. It also requires optimizing social capital, synchronizing policies, and awakening environmental consciousness [(Social and Human Capital Coalition, 2017), (Trienekens, 2011), (Diamond, et al., 2014), (Devaux, et al., 2018)]. The gap between the value chain actors and policymakers will be a barrier to emphasize the relationship and connectivity. Social capital's weakness will influence the SAAMBAT project value chain's sustainability, depending on the stakeholder's trust, networks, and communication.

Some improvements need to operate to upgrade the quality of the project implementation, including (1) developing a double-standard strategy for targeting both low-income or smallholder farmers and startup agricultural commercialization; (2) balancing the financial budget in human capacity and rural farmer's organizations (FOs) development; (3) creating more strategic and actual planning for FOs; (4) promoting the beneficiary business units to engage the new investors; (5) strengthening the collaboration work with ASPIRE and AIMS to achieve the mutual growth; (6) and the government needs to prepare the exit planning to maintain the sustainability of the project and to keep the networking of stakeholders could be tailored persistently after the project finished. Subsequently, Cambodia can take insight from neighboring countries' experiences and best practices, such as Thailand and Vietnam, concerning establishing SMEs' capacity and competitiveness (Wisuttisak, 2017). Those countries have advanced achievements to push their agricultural SMEs globally through export trading, coping with the global challenges, complying with the global certification standards, and obtaining strategic international partnerships. Rural SMEs in Cambodia can be upraised to reach the qualification baseline to enter the foreign market. Cambodia's SMEs can take part as food suppliers or goods producers in the global value chain.

5 CONCLUSION

SAAMBAT project is a powerful booster and facilitator to accelerate SMEs' internationalization in Cambodia and strengthen food security. The government should create a lively atmosphere and increase the harmonization among the related ministries for encouraging SMEs. The agricultural entrepreneurial ecosystem needs to have supporting policies that ensure its actions in domestic and global markets. The appropriate government policies will directly assist emerging local startups and SMEs growth faster and more energetic. SAAMBAT project management board and the government should concern not only low-income or smallholder farmers and low-level SMEs but also emerging business units in particular driven by youth. In general, the failure experiences among developing countries when incubating agricultural startups include an unclear entrepreneurial supporting system, weakness of providing the capital, lack of capacity building strategy to educate the startup's human capital, and weak business relationships both from the domestic

or domestic foreign environment. The initial approach of the SAAMBAT project to map and identify the holistic problems and universal views are the crucial starting points to elucidate the real needs of beneficiaries. SAAMBAT is also recommended to encourage the TSC to develop its organizational capability and business model to boost the digital economy's innovation. Further improvement and evaluation are required to maintain the process and enlarge the project's impacts.

ACKNOWLEDGEMENTS

The authors express gratitude to all the SAMBAAT project management boards in Cambodia for providing project reports in online access.

CONFLICTS OF INTEREST

The authors declare there is no conflict of interest in this desk study.

REFERENCES

- ADB. 2017. Tonle Sap poverty reduction and smallholder development project - additional financing: report and recommendation of the President [Internet]. Asian Development Bank. [cited 2020 Jul 16]. p. 1. Available from: <https://www.adb.org/projects/documents/cam-41435-054-rrp>.
- ADB. 2018. Additional financing of Tonle Sap poverty reduction and smallholder development project (RRP CAM 41435-054) [Internet]. Phnom Penh, Cambodia; Available from: <https://www.adb.org/sites/default/files/linked-documents/41435-054-ssa.pdf>.
- Akkoyunlu S. 2013. Agricultural innovations in Turkey. NCCR Trade Work Pap.
- Arias ME, Cochrane TA, Piman T, Kummu M, Caruso BS, Killeen TJ. 2012. Quantifying changes in flooding and habitats in the Tonle Sap Lake (Cambodia) caused by water infrastructure development and climate change in the Mekong Basin. *J Environ Manage*. Dec;112:53–66.
- Arbuckle Jr JG, Morton LW, Hobbs J. 2015. Understanding farmer perspectives on climate change adaptation and mitigation: The roles of trust in sources of climate information, climate change beliefs, and perceived risk. *Environ Behav* [Internet]. Feb;47(2):205–34. Available from: <https://pubmed.ncbi.nlm.nih.gov/25983336>.
- Centers for Disease Control and Prevention (CDC). 2013. Community needs assessment: Participant workbook. *Particip Work* [Internet]. 79. Available from: <https://www.cdc.gov/globalhealth/healthprotection/fet>

- p/training_modules/15/community-needs_pw_final_9252013.pdf.
- Demski C, Capstick S, Pidgeon N, Sposato RG, Spence A. 2017. Experience of extreme weather affects climate change mitigation and adaptation responses. *Clim Change* [Internet]. 140(2):149–64. Available from: <http://dx.doi.org/10.1007/s10584-016-1837-4>.
- Devaux A, Torero M, Donovan J, Horton D. 2018. Agricultural innovation and inclusive value-chain development: A review. *J Agribus Dev Emerg Econ*.8(1):99–123.
- Diamond A, Tropp D, Barham J, Muldoon MF, Kiraly S, Cantrell P. 2014. Food value chains: Creating shared value to enhance marketing success. U.S. Dept. of Agriculture, Agricultural Marketing Service.
- Doss CR, Meinzen-Dick R, Quisumbing AR, Theis S. 2017. Women in agriculture: Four myths. *Glob Food Sec*.
- Doss CR. 2018. Women and agricultural productivity: Reframing the Issues. *Dev Policy Rev* [Internet]. Jan 1;36(1):35–50. Available from: <https://doi.org/10.1111/dpr.12243>.
- Emeana EM, Trenchard L, Dehnen-Schmutz K. 2020. The revolution of mobile phone-enabled services for agricultural development (m-Agri services) in Africa: The challenges for sustainability. *Sustain*.12(2).
- FAO. 2009. Budget work to advance the right to food. Food and Agriculture Organization of the United Nations.
- FAO. 2014. Sustainability assessment of food and agriculture systems (SAFA) guidelines version 3.0.
- Hijweege W. 2019. Making knowledge, training, and extension work for smallholder access to markets.
- Hohenberger E. 2017. Women's empowerment through food security interventions: A secondary data analysis. *F Exch - Emerg Nutr Netw ENN*.2011(54 PG-25–26):25–6.
- IFAD. 2019. Cambodia sustainable assets for agriculture markets, business, and trade (SAAMBAT) project design report No. 2000002278.
- IFAD. 2020. IFAD and EIB launch \$125 million project to boost rural incomes and food security in Cambodia [Internet]. The International Fund for Agricultural Development (IFAD). [cited 2020 Jul 16]. p. 1. Available from: <https://www.ifad.org/en/web/latest/news-detail/asset/41758020>.
- Inter-American Development Bank. 2010. Development effectiveness overview special topic: Assessing the effectiveness of agricultural interventions.
- Kreft S, Eckstein D. 2016. Global climate risk index 2014. Who suffers most from extreme weather events? [Internet]. Think Tank & Research. 28 p. Available from: <http://germanwatch.org/en/download/8551.pdf>.
- Klofsten M, Norrman C, Cadorin E, Löfsten H. 2019. Support and development of small and new firms in rural areas: a case study of three regional initiatives. *SN Appl Sci* [Internet]. 2(1):110. Available from: <https://doi.org/10.1007/s42452-019-1908-z>.
- Kristjanson P, Bryan E, Bernier Q, Twyman J, Meinzen-Dick R, Kieran C, et al. 2017. Addressing gender in agricultural research for development in the face of a changing climate: where are we and where should we be going? *Int J Agric Sustain* [Internet]. Sep 3;15(5):482–500. Available from: <https://doi.org/10.1080/14735903.2017.1336411>.
- Lao P. 2019. Cambodia's agriculture productivity: Challenges and policy direction. Phnom Penh, Cambodia.
- Mbow C, Rosenzweig C, Barioni LG, Benton TG, Herrero M, Krishnapillai M, et al. 2019. Food security. In: *Food Security In: Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems* [PR Shukla, J Skea, E Calvo Buendia. In press; p. 437–550.
- MIH. 2019. Cambodia manufacturing supporting industry business directory 2019. Phnom Penh, Cambodia.
- Oliveira M de F, da Silva FG, Ferreira S, Teixeira M, Damásio H, Ferreira AD, et al. 2019. Innovations in sustainable agriculture: Case study of Lis Valley irrigation district, Portugal. *Sustain*. 11(2):1–19.
- Saiz-Rubio V, Rovira-Más F. 2020. From smart farming towards agriculture 5.0: A review on crop data management. *Agronomy*.10(2).
- Social and Human Capital Coalition. 2017. Forest products sector guide to the social capital protocol: Measuring social impact along the forest products value chain.
- Sraboni E, Malapit HJ, Quisumbing A, Ahmed A. 2014. Women's empowerment in agriculture: What role for food security in Bangladesh? *World Dev* [Internet].61(C):11–52. Available from: <https://econpapers.repec.org/RePEc:eee:wdevel:v:61:y:2014:i:c:p:11-52>.
- The World Bank. 2019. International development association project appraisal document on a proposed credit document No: PAD2505. Washington DC.
- The New Partners Initiative Technical Assistance (NuPITA). 2009. Monitoring and evaluation training curriculum.
- The World Bank. 2019. Rural population (% of total population) - Cambodia [Internet]. Cambodia. [cited 2020 Jul 16]. p. 1. Available from: <https://data.worldbank.org/>.
- The World Bank. 2019. World development indicators (structure of output). Washington DC.
- Thomas T, Ponlok T, Bansok R, De Lopez T, Chiang C, Phirun N, et al. 2013. Cambodian agriculture: Adaptation to climate change impact. *SSRN Electron J.*;(August).
- Trienekens JH. 2011. Agricultural value chains in developing countries a framework for analysis. *Int Food Agribus Manag Rev*.14(2):51–82.
- UN Economic and Social Commission for Asia and the Pacific (ESCAP). 2020. Evaluation of the centre for sustainable agricultural mechanization (CSAM). Vol. 00255.
- USAID Modernizing Extension and Advisory Services (MEAS). 2005. Human resource development for

- agriculture extension and advisory services. Vol. 44, Strategy.
- USDA. 2019. A case for rural broadband. (April).
- Valdez CD. 2011. Building a sustainable business plan. ProQuest Dissertations and Theses. 57-n/a p.
- Wisuttisak P. 2017. Law for SMEs promotion and protection in Vietnam and Thailand. 6(1):60–8.
- Yusuf AA, Francisco HA. 2009. Climate change vulnerability mapping for Southeast Asia vulnerability mapping for Southeast Asia (Singapore: economy and environment program for Southeast Asia-DEEPSEA).

