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**FINAL EVALUATION of
SDC's
CAMBODIA HORTICULTURE
ADVANCING INCOME AND
NUTRITION (CHAIN)
PROJECT**

FINAL REPORT

Prepared for

**Swiss Agency for Development
and Cooperation (SDC)**

By

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LIST OF ACRONYMS

ACI	Agrifood Consulting International
ACSEP	Agricultural Value Chain Competitiveness and Safety Enhancement Project
AIMS	Accelerating Inclusive Markets for Smallholders
ASPIRE	Agriculture Services Programme for Innovation, Resilience and Extension
BMZ	German Federal Ministry of Economic Cooperation and Development
CASDP	Cambodia Agricultural Sector Diversification Project
CBA	Cost Benefit Analysis
CBR	Cost Benefit Ratio
CEA	Cost Effectiveness Analysis
CHAIN	Cambodia Horticulture Advancing Income and Nutrition
CPI	Consumer Price Index
DAC	OECD Development Assistance Committee
FDFA	Federal Department of Foreign Affairs
FGD	Focus Group Discussion
FO	Farmer Organization
GDA	General Directorate of Agriculture
IFAD	International Fund for Agricultural Development
IRR	Internal Rate of Return
KI	Key Informant
KII	Key Informant Interview
KRT	Kratie
M&E	Monitoring and Evaluation
MAFF	Ministry of Agriculture, Forestry, and Fisheries
NGO	Non-Government Organization
NPV	Net present value
ODM	Oddar Meanchey
PADEE	Project for Agricultural Development and Economic Empowerment
PaFF	Partnership for Forestry and Fisheries
PDAFF	Provincial Department of Agriculture, Forestry, and Fisheries
PVH	Preah Vihear
RED	Regional Economic Development
SDC	Swiss Agency for Development and Cooperation
SGD	Small Group Discussion
SNV	Netherland Development Organization
STT	Stung Trend
TOR	Terms of Reference
TSSD	Tonle Sap Poverty Reduction And Smallholder Development Project
TSSD-AF	Tonle Sap Poverty Reduction And Smallholder Development Project Additional Finance

1. BACKGROUND AND OBJECTIVES ON THE REPORT

The current assignment aims at conducting the evaluation of the Swiss Development Corporation (SDC) funded Cambodia Horticulture Advancing Income and Nutrition (CHAIN) project. The Project was mandated by SDC, in line with the priorities of the Royal Government of Cambodia (RGC) and the SDC Mekong Strategy 2018-2021. The overall duration of the CHAIN project is eight years; it started in December 2014 and is expected to end in December 2022. CHAIN focuses on developing the horticulture sector in four relatively remote and poor provinces of Cambodia: Oddar Meanchey, Preah Vihear, Stung Treng and Kratie. Through strengthening the horticulture market systems, the project has a strong focus on women and delivering sustainable income growth and improved household food security and resilience.

The evaluation assessed progress towards the achievement of the project objectives and outcomes as specified in the Project Documents of phases I to III. The objectives of this evaluation are:

1. To evaluate the results achieved, assess the relevance, coherence, effectiveness, efficiency, impact and sustainability of the project implementation.
2. To assess the extent that project results achieved are sustainable and can be sustained once the project ends.
 - a. How much ownership is there both at national GDA/MAFF and at the four sub national PDAFFs, do they have the capacity to manage, implement, coordinate, monitor, report a similar approach in future projects, to what extent can they continue the activities with their existing financial resources, or are they able to attract resources to replicate similar intervention types?
 - b. Will the private sector actors include national and subnational continue to offer the products, services and market linkages/ business opportunities to the target group of CHAIN? What are their challenges and opportunities for scaling-up and investment in the project target provinces?
 - c. Will the formed producer and multi-stakeholder groups and cooperatives continue to operate?
 - d. Will the Smart Water Agriculture intervention technologies help farmers to have more cycles and sustainable round year vegetable production?
 - e. Systemic measurements: Which sub-systems of the market system will continue to function after chain ending (i.e., extension, inputs, market linkages etc.?)
 - f. What changes have been achieved in the enabling environment, policies, rules & regulations?
 - g. Which are the most viable approaches which CHAIN used for developing the horticulture subsectors?
3. To document some key lessons learned from the project, which can be used in scaling up, and replicated for future project design.
4. To capture some key success stories.
5. To conduct project's Cost-Benefit Analysis (CBA) in line with SDC's guidelines.

2. METHODOLOGY

Given the time allocated to the assignment, the Evaluation Team opted to use qualitative methodologies to answer the evaluation questions, except for the cost-benefit analysis which was based on the SDC's guidelines¹. Five types of methodologies were used, which are:

¹ SDC How-to-Note, (2015), "Financial and Economic Analysis of Project with a focus on Cost Benefit Analysis and Cost Effectiveness Analysis"

- Document reviews
- Interviews: (i) key informant interviews, and (ii) focus group discussions with direct beneficiaries (i.e., farmers and farmer organization partners of the project)
- Direct observations, combined with Data Quality Assessment to check accuracy of reported results
- Cost-Benefit Analysis as the benefits of the project can be mainly monetized
- Feedback obtained during intermediate briefings to SDC and the Final Workshop held in Phnom Penh on April 22, 2022

The details of the methodology are presented in the Inception Report².

In the following sections, the Evaluation Team will provide arguments for the scoring reported in the Project Assessment Grid (see ANNEX 1). The Project Assessment Grid is required by the TOR of the assignment and covers 15 key aspects of the five OECD Development Assistance Committee (DAC) criteria including relevance, coherence, effectiveness, efficiency, and sustainability.

3. PROJECT DESCRIPTION

3.1. Objectives

CHAIN was implemented in three phases from 2015 to 2022. Overall, its design was simple. It had only two objectives for each phase. The objectives in Phase 1 are slightly different from the latter two phases. While Phase 1 focuses on food security, Phase 2 and Phase 3 put more emphasis on nutrition. Even though, “income” of its target beneficiaries remained the core objective throughout the project life

3.2. Interventions

In each phase, CHAIN was confined to three interventions. From phase to phase its interventions reflect incremental changes from building the basics for agricultural (in particular, vegetables) production (Phase 1) through helping to create an enabling environment (Phase 2) to facilitating value chain and sector performance (Phase 3). The project’s interventions are well linked to its objectives, especially regarding improving income that is driven by better (vegetables) value chain performance.

3.3. Approaches

The project used a hybrid approach to building capacity of its target beneficiaries, be they in farm production skills, market linkages and value chain, or product quality assurances. It employed both group and individualized approaches as well as field- and classroom-based approaches. Its underlying approach, nonetheless, was a market approach based on Market for the Poor (**M4P**) as represented in the diagram below (**Figure 1**).

² ACI, Inception Report of Final Evaluation of SDC’s Cambodia Horticulture Advancing Income And Nutrition (CHAIN) Project. Prepared For Swiss Agency For Development And Cooperation (Sdc) By Agrifood Consulting International, 12 April 2022.

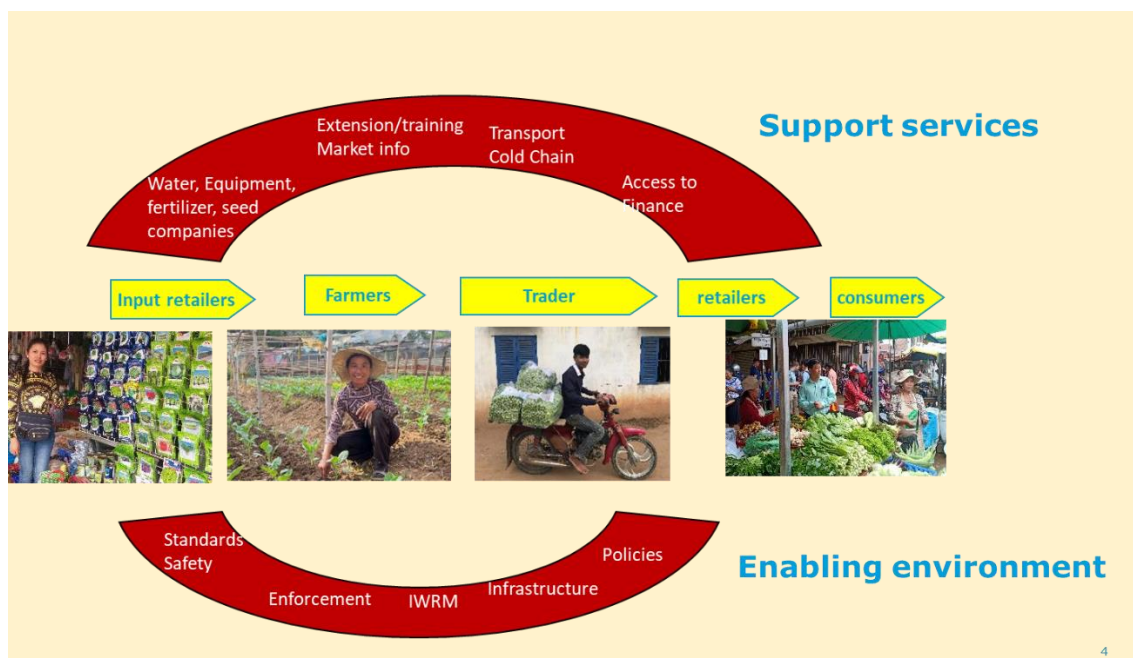


Figure 1 Market-based Approach to CHAIN

3.4. Implementation Arrangements

Implementation arrangement was the same throughout the three phases. The implementation was executed, managed and led by SNV team that worked closely with several NGOs and government agencies, especially PDAFFs and PDOWAs and MAFF/GDA. The implementation was overseen and guided by a Project Advisory Committee³. The Steering Committee is headed by a representative of MAFF as chair. The permanent members are: a) Representative of Ministry of Agriculture Forestry and Fisheries, Chair b) SDC Director of Cooperation c) Representative of General Department of Agriculture (GDA) d) Representatives of Provincial Governments Kratie, Stung Treng, Preah Vihear, Oddar Meanchey e) Country Director of SNV f) Director of Department of Horticulture – GDA g) CHAIN team leader.

3.5. Beneficiaries and Geo-Targets

At the initial phase, CHAIN aimed to target directly 6,000 farmers and 200 processors with the sideline target of 24,000 household members with increased dietary diversity. In the second phase it increased the number of direct beneficiaries by 37.9% to 8,550 farmers, and the sideline target of 25,000 household members with increased nutrition. In the final phase, it scaled down the number of its direct beneficiaries to 6,000 farmers that was equivalent to the original target in Phase 1.

During its 8-year period, CHAIN worked in four provinces in the north of Cambodia, including Oddar Meanchey, Preah Vihear, Stung Treng and Kratie. During Phase 1, the project started to work in 22 districts, which later in Phase 3, has expanded to 24 districts comprising 259 villages within 103 communes (**Table 1**). At the end of Phase 3, the project scaled back or withdrew from several communes and villages.

³ In project design documents the committee is called Project Advisory Committee whereas in project annual reports it is called Project Steering Committee.

Table 1 CHAIN's target districts

Province	Number of districts	Number of communes	Number of villages
Oddar Meanchey	5	23	76
Preah Vihear	8	32	67
Stung Treng	5	24	53
Kratie	6	24	63
Four provinces	24	103	259

3.6. Funding

CHAIN is a 8-years project, with an overall funding about CHF 10.0m (US\$10.1m). The initial phase accounted for 35.8% of the total funding, which were spent on relevant processes, laying the groundwork and building the foundation for the planned activities. Expenditures for the second were the highest, with 44.0% of the total. Phase 2 was the most important phase when the project tried to scale up, consolidate and optimize its results, and to rationalize its final phase. The lowest amount of funding was allocated to the final phase with 19% of the total. During Phase 3, the project prepared the wrap up, exit and closure. The focus of this final phase was to support and reinforce commercialization of the vegetables sub-sector at both sub-national and national levels.

4. RELEVANCE

4.1. Key Aspect 1

Key aspects based on DAC Criteria	Evaluation (Score)
The extent to which the objectives of the intervention respond to the needs and priorities of the target group.	Satisfactory (2)

During Phase 1, the objectives of the interventions were to increase income and food security of smallholder farmers and better resilience to change. These objectives were highly responsive to the needs and priorities of the target group, considering that in the target provinces there were some of the highest concentrations of rural poverty and food malnutrition in Cambodia.

In later phases of the project, the objectives were focused on increasing income and nutrition from horticulture production and trade.

The focus on horticulture, which in most cases was limited to vegetable production, became evident already in Phase 1. This was a courageous choice on the part of the implementation agency, although not the most intuitive one at the time because in the target provinces, the main source of income of the population was quite different from horticultural production. Instead, most farmers get their income from cassava, rice, logging, and other trade-related activities, particularly border trade.

Although the focus on horticulture (mainly vegetables) was highly relevant in terms of nutritional diversity, it could hardly be considered relevant at the beginning of the project as an activity that could contribute to raise income substantially. Later phases proved that the choice by the implementation agency was a good one and income of the target beneficiaries indeed did increase through vegetables production and trade.

4.2. Key Aspect 2

Key aspects based on DAC Criteria	Evaluation (Score)
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The extent to which the objectives of the intervention respond to the needs and priorities of indirectly affected stakeholders (not included in target group, e.g. government, civil society, etc.) in the country of the intervention.	Highly Satisfactory (1)
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The objectives of the intervention were highly relevant to the priorities of the government, civil society, and a growing segment of the urban consumers with an increasing concern for food safety, particularly related to vegetables. Moreover, the emphasis on horticulture was perfectly in line with the drive towards agricultural diversification promoted by the government, since the introduction of the Agricultural Sector Strategic Development 2006-2010 and the subsequent plans that was aimed to diversify Cambodian agricultural sector and promote market access for Cambodian agricultural products and the adoption of the Crop Sub-sector Strategic Development Plan 2019-2023⁴.

4.3. Key Aspect 3

Key aspects based on DAC Criteria	Evaluation (Score)
The extent to which core design elements of the intervention (such as the theory of change, structure of the project components, choice of services and intervention partners) adequately reflect the needs and priorities of the target group.	Satisfactory (2)

The approaches based on capacity building, market development, and smart water management reflected the needs and priorities of the target group. For water management, the crucial needs were already evident in Phase 1, but the emphasis became more noticeable in the project design during Phase 2 and particularly during Phase 3. An earlier focus on water management would have improved the relevance of the intervention even further.

Access to finance was notably missing from the interventions even though issues of access to finance or credit were clearly identified in the design of Phase 1, and certain limited interventions were proposed such as group savings and credit activities by farmer groups. The constraint on financing technologies introduced by the project came up frequently throughout the project implementation. For a brief period during Phase 2, some dialogues by the project team with financial institutions, specifically ARDB, AMK and LOLC, were undertaken; the dialogues, though did not had concrete results. The project was only able to get a borehole drilling service provider in Kratie, who is offering the service on credit. Overall, despite the fact that the project did contribute to the investment of various beneficiaries, mainly through cost sharing initiatives, a specific set of interventions focused on improving access to finance was not present throughout the implementation of the project.

5. COHERENCE

5.1. Key Aspect 4

Key aspects based on DAC Criteria	Evaluation (Score)
Internal coherence: the extent to which the intervention is compatible with other interventions of Swiss development cooperation in the same country and thematic field (consistency, complementarity and synergies).	Highly Satisfactory (1)

⁴ With the Crop Sub-sector Strategic Development Plan 2019-2023, the General Directorate of Agriculture (GDA) encourages farmers to adopt smart agriculture to maintain sustainable growth. This plan includes the objective to promote vegetable processing and continues to support diversification of vegetable production. Thus, local produce can substitute imported vegetables and ensure standard and high-quality vegetables for domestic consumption. To ensure quality, safety and public recognition of the products, certifications like CAMGAP and CAMOrganic have been developed and implemented by GDA.

SDC Cambodia focuses on three domains: Local Governance, Citizen Participation and Health; Agriculture and Food Security; and Skills Development and Employment. In the Agriculture and Food Security domain, SDC improves sustainable livelihoods, food security and income of rural women and men, especially indigenous people and ethnic minorities. The programme closely interlinks the improvement of market-oriented production practices, nutrition awareness and income from horticulture and safe and secured access to as well as sustainable control over natural resources (fisheries, forestry) and production means.

CHAIN is fully consistent with the thematic domain of SDC strategy in Cambodia. Moreover, the project is complementary to and synergetic with other programs of both SDC such as Partnership for Forestry and Fisheries (PaFF) and other partners such as Support for regional economic development (RED) together with the German Federal Ministry of Economic Cooperation and Development (BMZ). The overall goal of RED is that the rural population, especially vulnerable groups, improve their economic and social living conditions. The programme therefore strengthens the capacities of provincial authorities to promote local economic development.

CHAIN is aligned with SDC Agriculture and Food Security Goal for Cambodia, namely: “Women and men smallholder farmers (including female-headed households and ethnic minorities) improve their livelihood resilience.”

5.2. Key Aspect 5

Key aspects based on DAC Criteria	Evaluation (Score)
External coherence: the extent to which the intervention is compatible with interventions of other actors in the country and thematic field (complementarity and synergies).	Highly Satisfactory (1)

The design and implementation of CHAIN was fully coherent with the *Rectangular Strategy for Development, Phase IV 2019-2023 (RS-IV)* and the strategic frameworks represented by *National Strategic Development Plan 2019-2023 (NSDP)* and the *Agricultural Strategic Development Plan 2019-2023 (ASDP)*. The latter emphasizes the importance and potential of smallholder farmer inclusion in value chains. The *National Strategic Development Plan (2019-2023)* prioritizes the agriculture sector and describes the activities required to transform the sector. The planned transformation would take Cambodia from being primarily dependent on the expanded use of available land and water resources and traditional agricultural inputs, to an agriculture sector primarily focused on the application of new techniques, new technologies, mechanization and irrigation to improve productivity; commercialization; and diversification into high-value crops, livestock, and aquaculture in an environmentally sustainable manner.

There is further coherence with the *Crop Sub-sector Strategic Development Plan 2019-2023*, which continues to support diversification of vegetable production; and the *Strategic Plan for Cambodia Agro-Industrial Sector Development 2019-2030* focused on the promotion and strengthening of agricultural product processing for import substitution and export to international markets. To ensure sustainable agriculture practices, the *Strategic Plan for Climate Change Adaptation 2019- 2023* for agricultural sector was adopted. This strategic plan emphasizes effective irrigation and water management, as well as minimizing the negative effects of chemical pesticide and fertilizer use in the agricultural sector.

In 2015, MAFF adopted the *Agricultural Extension Policy* which promotes greater access by farmers to better agricultural information, knowledge, and technologies in order that they can enhance agricultural productivity, diversification, and commercialization.

CHAIN has also worked in coherence with the *Law on Agriculture Cooperatives* and the supporting *Sub-Decree on Contract Farming*; and in fully harmony with the *Gender Mainstreaming Policy and Strategic Framework in Agriculture 2016-2020* by MAFF which recognizes the significant contribution of Cambodian women to agricultural labour, production, harvest, processing and marketing.

The *Cambodia Horticulture Development Policy (2020-2030)* development process has been ongoing since 2018 under GDA leadership and with support from USAID funded HARVEST 2 and CHAIN. Specific attention points include, amongst others, high value focus crops, market space for local vegetables, lower costs of inputs, access to technologies for safe food production, Public Private Partnership collaborations on gender sensitive extension service provision. In addition, improved quality control of imported vegetables in view of increasing local competitiveness. CHAIN's promotion of collaboration between public and private sector partners has been an example for other development initiatives and the Government. CHAIN fostered PPPs and collaboration to strengthen the extension service delivery in the four provinces and fed experiences back to national level dialogues.

CHAIN has operated within the *Strategy of Agriculture and Water Resources (SAW)*, a joint strategy from 2010- 2013 of MAFF and the Ministry of Water Resources and Meteorology (MoWRAM) whereby Cambodia aims to be: “promoting improved farm water management through water harvesting/storage, gravity-fed irrigation systems, and technology such as drip irrigation of crops.” Cambodia has adopted a *Participatory Water Management and Development (PWMD)* approach to the planning, development and management of water resources. Policy and instructional frameworks were developed to support the decentralized water management through which the government is developing responsibility for all water management activities, including the regulation of water access, the collection of fees, and monitoring. In 2005 the RGC developed the *Water Law*, with its crucial Article 19 stating that “All farmers using water from the irrigation system or part thereof may form a Farmers’ Water User Community (FWUC)”.

CHAIN is compatible with similar agricultural programs such as PADEE (2012-2018), TSSD & TSSD-AF (2008-2023), ASPIRE (2014-2022), AIMS (2016-2023), HARVEST I (2011-2016), CASDP (2019-2025), and ACSEP (2021-2025). These projects have similar interventions (including, small-scale irrigation schemes, rainwater harvesting, solar pumps, plastic mulching, net/green-houses, CAMGAP, savings and credit, access to finance, sales points, marketing, etc.) to those of CHAIN regarding supporting smallholder farmers in vegetables value chains. Some of them were and are in the same target areas and with the same beneficiaries (e.g. ASPIRE). ASPIRE and CHAIN have both cofinanced greenhouses and solar pumps (observed in all CHAIN provinces)

CHAIN contributed to the preparation of Cambodia's horticulture policy led by HARVEST II (2017-2022). It was generally engaged in relevant policy dialogues, interactions, and events. It provided certain limited support to policy forums and development of CamGAP information materials. As the project is approaching its closure, CHAIN team has tried to persuade other projects such as AIMS to support its target beneficiaries.

6. EFFECTIVENESS

6.1. Key Aspect 6

Key aspects based on DAC Criteria	Evaluation (Score)
The extent to which approaches/strategies during implementation are adequate to achieve the intended results.	Satisfactory (2)

The capacity building strategy based on hybrid field school approach (for groups and individual farms) and implemented through PDAFF and other NGO partners was highly effective and was reinforced by the Market Linkages approach and Markets for the Poor approach – M4P. Both approaches were highly successful in bringing skills, technologies, and market linkages to farmers and contributed to rapid production growth and successful substitution of a noticeable part of vegetable imports.

The emphasis on integrated water management and use of smart water solutions that characterized later Phases of the project was highly appreciated by farmers and contributed to labor saving practices and increasing productivity while improving resilience to climate change.

The approach to food safety was to ensure more awareness of the issue of food safety, standards and requirements (CAMGAP and CAMORG) for organic food production, including the registration of bio-control agents. Although more awareness was achieved, there has been less success in ensuring that increased food safety could be translated in higher demand and higher prices for farmer's products.

6.2. Key Aspect 7

Key aspects based on DAC Criteria	Evaluation (Score)
The extent to which the intervention achieved or is expected to achieve its intended objectives (outputs and outcomes).	Satisfactory (2)

Most interventions were very appropriate to achieve intended objectives. Only in the case of nutritional objectives, the approach and interventions seem to have been less effective in achieving objective and the interventions were discontinued in Phase 2.

The objective of nutrition to increase diversity of diet and improve awareness of nutrition could have been reached to a limited extent. However, there is no evidence proving that nutritional status/condition of the target population is enhanced; no report on nutritional indicators (e.g., BMI, wasting, stunting) is available. One may assume that as the income of the target population increases, they would be able to increase their overall food consumption. However, this does not mean that they would consume better nutritional foods. For example, Cambodia's Demographic and Health Survey 2010's data showed that as poverty decreased (or income increased) during 2000-2010 more children were wasted and underweight from 2005 to 2010, and more women became obese from 2000 to 2010. (As income increases, people might be tempted for junk foods such as processed foods, packed foods, etc.) Possibly, the people might increase nutritional awareness due to the project; but that may not have much impact if they do not consume nutritional foods.

During Phase 1, the project enhanced nutrition knowledge and vegetable intake frequency. It empowered women to make decisions on food choices. Nevertheless, the project did not increase household dietary diversity. Nutrition improvement of target HHs, if at all, was very limited⁵. During subsequent Phases, there is no information about nutritional results.

⁵ During Phase 1 the project recommended three home-garden models – riverbank (10 HHs), lowland (10 HHs) and highland (10 HHs) models – to farmers that could meet dietary intake of 200 grams of vegetables per person per day for most months during harvest period. However, in December only 37 g/person and 147 g/person are

6.3. Key Aspect 8

Key aspects based on DAC Criteria	Evaluation (Score)
The extent to which the intervention achieved or is expected to achieve its intended results related to transversal themes.	Highly Satisfactory (1)

Most interventions were appropriate to achieve intended objectives and the transversal themes of gender empowerment, climate change resilience, and disaster risk reduction.

Women represented the majority of the beneficiaries (more than 70% of the total) and were empowered by the project in various dimensions: more recognition for their contribution within the family, adoption of less labor-intensive technologies (particularly in irrigation and weeding), improved status as successful farmers and traders, improved knowledge about food safety and nutrition.

The use of water smart technologies, including drip irrigation, solar pumps, greenhouse, and mulching sheets improved the capacity of farmers to deal with a number of climate risks and disasters and translated in improved resilient to disasters.

7. EFFICIENCY

7.1. Key Aspect 9

Key aspects based on DAC Criteria	Evaluation (Score)
The extent to which the intervention delivers the results (outputs, outcomes) cost effectively.	Satisfactory (2)

The project cost of CHF 10 million should be compared to the benefit in terms of income. As shown more in detail in the CBA report⁶, independently on the use of nominal or adjusted margins, the Internal Rate of Return (IRR) is above 24%, which corresponds to Net Present Value (NPV) of US\$2.08 million, and Benefit Cost Ratio (BCR) of 1.31.

However, the choice of the beneficiaries matters. Working with homestead farmers is not cost effective for the project. Out of the 3 scenarios for homestead farmers tested, only 1 presented positive but low NPV (US\$ 49,210), and IRR of 18% and BCR of 1.07. The other scenarios showing negative NPV, low BCR (between 0.36 and 1.07) do not meet the threshold of a good project

available, respectively, from the riverbank model and the lowland model. In the case of the highland model, only 94 g/person are available during July.

Despite high vegetable supplies in some months (from these models), family nutritional needs were only partially met. Of the seven essential nutrients (protein, vitamins A, C & E, Ca, Fe, Zn), only vitamin C was consistently sufficient. Calcium, iron and especially zinc were consistently least sufficient (5-50%). Food gaps of 4-5 months were present in all models. It was therefore recommended that to alleviate the gap, food could be collected from the wild, home yard (traditional crops) or bought from the market. Local plant foods including banana, papaya, moringa, mushrooms, bamboo shoots, ivy gourd, neem, star gooseberry and red bead tree are available during food gaps. Other food groups such as meat and dairy, and zinc fortified foods are needed.

⁶ ACI, Cost Benefit Analysis Report. Final Evaluation of CHAIN, prepared by Agrifood Consulting International, May 2022

investment. On the other hand, highest returns are observed for semi-commercial and commercial farmers, independently on the delay in attaining the optimal margins from horticulture farming. NPVs are all positive and above US\$4.53 million, with IRR between 58% and 173%, BCR between 2.14 and 2.62

7.2. Key Aspect 10

Key aspects based on DAC Criteria	Evaluation (Score)
The extent to which the intervention delivers the results (outputs, outcome) in a timely manner (within the intended timeframe or reasonably adjusted timeframe).	Satisfactory (2)

The project interventions have delivered results in a timely manner. Slight delays might have occurred during 2020 early COVID experience, but the project recovered relatively quickly.

In Phase 1, attainments of the intended results were limited although the project reached out to more beneficiaries than planned. In Phase 2, the project overachieved the results overall. Nevertheless, there is no information on achievement relating to nutrition awareness. Results for Phase 3 is undecisive as the project is still going on and no relevant data are available. See **Table 2**.

Table 2 Results and Target

CHAIN 1 (2014-2017) ⁷	CHAIN 2 (2017-2020) ⁸	CHAIN 3 (2021-2022) ⁹
Target: 6,200 of direct beneficiaries Target overachieved; 6,800 direct beneficiaries reached	Target: 9,750 of direct beneficiaries ¹⁰ Target overachieved; 10,209 direct beneficiaries reached	Target: 7,200 of direct beneficiaries ¹¹
Target: 1,000 commercial farmers with increased income by an average of US\$400/year Target not achieved; very small increase	Target: (a) 3,400 commercial farmers with net increased income by an average of US\$600 from vegetables; and (b) 2,850 semi-commercial farmers with net increased income by an average of US\$200 from vegetables Target slightly overachieved for both groups	Target: 6,000 semi-commercial and commercial farmers with net income of at least US\$200 from fruits and vegetables
Target: 5,000 homestead farmers with increased income by an average of US\$100/year Target not achieved; very small increase	Target: 2,300 homestead farmers with increased income by an average of US\$50/year vegetables Target overachieved by three times	Target: 1,200 indirect farmers with income increase from fruits and vegetables related farming activities
Target: 200 processors with increased income by an average of US\$100/year from processing activities	–	Target: 50% of consumers reached through market campaign to eat local vegetables, with light nutrition awareness

⁷ Phase 1 Evaluation Report

⁸ End of Phase 2 Report. No logframe is available for Phase 2, and no high-result indicator/s for nutrition was/were defined. The high results were focused entirely on income.

⁹ It is ongoing; no final reporting on results yet.

¹⁰ This number includes also indirect beneficiaries.

¹¹ This number includes also indirect beneficiaries.

Target overachieved		
Target: 24,000 household members increased intake of food covering basic needs of essential nutrient components	Target: 25,000 persons from homestead households with nutritional awareness	Target: Women perceived workload as manageable and commensurate with benefits
Target not achieved	No information on achievement	
Target: 60% of targeted farmers able to articulate how their household resilience improved due to the project	–	Target: 34,560 people benefiting from locally implemented DRR measures, incl. water
Target almost achieved		
Target: 80% of households aware of improved dietary diversity for individual members	–	Target: 4,500 farmers with increased productivity (or yield) and adopted two or more climate resilient technologies and smart water practices in the past 12 months
Target not achieved		
The percentage of rural households with year-round food self-sufficiency increased	–	Target: 1,200 horticulture farmers increased their farm production within a context of improved water resource management
Target achieved; moderate increase		

7.3. Key Aspect 11

Key aspects based on DAC Criteria	Evaluation (Score)
The extent to which management, monitoring and steering mechanisms support efficient implementation.	Satisfactory (2)

Management was recognized very supportive to efficient implementation. It was widely recognized as based on a flexible approach in which decisions were taken based on evidence and results as well as constraints with which the project was faced. For example, the decision to phase out nutrition interventions, and homestead farmers, and promote smart water solutions in Phase 3, and drop activities on vegetable processing were all taken with a view to achieving the higher order impact of the project and ensure effectiveness and efficiency of the interventions. The effort is clearly reflected in the design.

In the case of monitoring, the system was a little complicated and often not clearly presented or communicated. For example, the indicators on income were not clearly collected or communicated. Maybe there were too many indicators. The logbooks, although a very innovative idea, did not lead to a reliable database given the often-incomplete format of the data.

Steering committee (called Project Advisory Committee in project design documents) met regularly and was very supportive of the project. The project advisory committee members were involved in field visits and interactions with the beneficiaries. The committee was considered to provide strategic advice and guidance in the project implementation and operation, and additional access to relevant and important networks and information. And, during the final phase the committee played an important role in facilitating the hand-over of results and development to MAFF/GDA.

8. ACHIEVEMENTS

The Project made a number of achievements in terms of various indicators related to income, production, and market development. The following discussion organizes the discussion of achievements showing where the project made a strong improvement, a moderate improvement, and no appreciable improvement (**Table 3**).

Table 3 Achievements

Strong Improvement	Moderate Improvement	Not Appreciable Improvement
Farmer production skills	Production Planning	Adoption of GAP Standards
Technology adoption	Capacity of PDAFF	Adoption of ORG/PGS Standards
Local Production	Awareness of FS among target groups	Food Safety Awareness among consumers
Income of farmers	Adoption of FS Standards among target groups	Linkages to VC (national) Actors
Income of local traders (outputs and inputs)	Linkages to VC (local) Actors	National Policy
	Share of Local Production in Local Trade	
	Provincial Strategies	

8.1. Strong Improvement

Farmer production skills. CHAIN introduced, demonstrated, and supported the adoption of several farmer production skills that contributed to the success of the overall project. The skills included production planning, grading, packaging, linking with traders, teaching, making demonstrations, and keeping records and accounts.

Technology adoption. Through CHAIN farmers discovered new technologies appropriate for vegetable production such as mulching sheet, drip irrigation, solar pumps, greenhouse, seed selection, GAP/non-conventional farming. These technologies resulted in reduced labor input per unit of output and overall increased productivity and production; and improve product quality.

Local production. The increased productivity of local vegetable farmers translated into larger production volumes that could supply local markets. In most cases production of farmers involved in CHAIN increased several folds their initial volumes, particularly in the case of semicommercial and commercial farmers where volumes more than doubled.

Income of local producers and local traders. As a result of larger production volumes, the income of farmers increased considerably, and similar increase affected both input and output local traders. In the case of farmers and traders, volume of sales was reported to have more than doubled in several cases over the course of participation to the CHAIN project.

8.2. Moderate Improvement

Production Planning. The effort of CHAINS to link farmers and traders had one important impact on the realized need by farmers to improve production planning, both at the individual level and at the group level. Improved production planning would ensure a better chance to bring produce to the market successfully, taking into account the seasonal variability of demand and various shocks to the market that can be promptly communicated by traders. Rather than having production of all farmers focused on the same products, making more difficult to sell those products at an adequate price, production planning introduced some coordination in the action of farmers and traders that had not

existed before. Although failure in coordination continued to exist in several cases, the improvement in other cases was visible and a new occurrence for many farmer groups.

Capacity of PDAFF. Since the beginning of the project, there has been a close collaboration between the implementation agency, GDA, and PDAFF. PDAFF staff received intensive training in the technology for improving horticultural sector and various approaches to market development, business acceleration, smart water solutions, and lead farmer incubation. In most provinces, young and recently graduated staff of PDAFF were the ones to be actively involved in the training, both on the receiving side and as active trainers of farmers. Their work was highly appreciated by most farmer groups. Although several PDAFF staff admitted that their capacity remain limited when it comes to new technologies and agri-business skills and had additional responsibilities, and their willingness to learn from the project and more was the basis for an appreciable improvement in their capacity.

Awareness of Food Safety among target groups. The capacity building of farmers was focused not only on production techniques, but also on food safety principles and standards (see below). This emphasis on food safety primarily was dedicated to the adoption on more sustainable methods of cultivation with a moderate use of chemicals not to exceed maximum residue levels and the adoption of various methods to reduce food contamination with toxic elements. This awareness was important in communicating with traders and ultimately consumers in the local market to ensure the building of some reputation for food safety associated with CHAIN products. Nonetheless, consumers in certain target provinces do not appreciate CHAIN farmers' products. For example, most consumers in Stung Treng and many in Kratie markets still prefer products from traditional farmers and their regular vegetables retailers.

Adoption of Food Safety Standards among target groups. CHAIN made an effort in introducing food safety standards as codified in CAMGAP, CAMORG, and PGS. The effort was sustained mostly over the last two phases of the project and achieved some modest results in terms of number of farmers reached by the trainers. Only a few farmers were able to apply for the certification and by the end of the project it is expected that a modest number of them will be certified.

Linkages to Value Chain (local) Actors. CHAIN was clear from the beginning of the project about the need of linking farmers to other actors in the value chain, particularly input and output traders. These linkages implied a sharing of information and the establishment of trust among the actors. The results were more effective at the local level where local traders and farmers had the chance to meet and know each other better and to form mutually beneficial commercial relationships.

Share of Local Production in Local Trade. The increased productivity of local vegetable producers translated into larger production volumes that could supply local markets. From an average of over 50% of total vegetable consumption being imported from outside of each province, the share of imported products went down to 30%.

Provincial Strategy. One of the main efforts of the project was to support PDAFF in the elaboration of provincial strategies for the horticultural sector. In some cases, this effort was successful in preparing a clear strategy for the provinces, for example in the case of Oddar Meanchey and the strategy to promote yellow melon as an excellency by the province. In other cases, although the project assisted PDAFF in the preparation of the provincial strategy, the resulting outcomes were documents that still need further strengthening. The documents produced for Stung Treng and Kratie cannot be considered strategies. In the case of Stung Treng the document is labeled a concept note with matrices of activities for dialogues and a programme for fieldworks. The concept note is for a support to a community and a GI product thereof. For Kratie, the document is called a strategic plan for vegetables

sub-sector in Kratie 2021-2023; however, its contents cannot be considered a strategy, but rather a project concept.

8.3. No Appreciable Improvement

Adoption of GAP Standards. Only a few farmers were able to apply for the certification and by the end of the project it is expected that a very small number of them will be certified.

Adoption of ORG/PGS Standards. In this case, the adoption has been minimum. Although farmers were introduced to the standards, it is the understanding of the Evaluation Team that none of them has been certified.

Food Safety Awareness among consumers. Although CHAIN made an effort in introducing food safety awareness among producers, and in some cases supported initiative such as “Planted by Khmer” to emphasize the food safety of domestic production, the project has been less successful in reaching out to the average consumers in the target provinces. The local markets exhibit poor hygiene standards, and contamination of food occurs at the very market stalls (see image to the right where vegetables and fresh pork meat are displayed side by side in the market with ongoing contamination from meat to vegetables).



Linkages to Value Chain (national) Actors. CHAIN has been successful in linking farmers to local traders and stimulate commerce of horticultural products within each province. The project has made efforts also in linking national players to provincial actors. In the case of national input traders such as East West Company, CHAIN succeeded in linking farmers to the national suppliers. However, less successful have been the efforts to ensure stable commercial relationships between provincial producers and national buyers (like supermarkets or wholesalers).

National Policy. CHAIN supported GDA in the process of formulation of the National Horticultural Policy. The key/dominant donor in the process is HARVEST II and CHAIN has a supportive role. This process has not yet been concluded, in spite of having started since 2018.

9. IMPACT

Overall, impact on income of the target groups was positive. However, the achievement in Phase 1 fell short of the targets, while in the latter phases, overachievements were noted as the targets were adjusted in the project design. The following sections shows the areas where the project made a strong impact, a moderate impact, or did not have much impact (**Table 4**).

Table 4 Impacts

Strong Impact	Moderate Impact	Not Appreciable Impact
Farmers Income	Food Safety	Linkages with Value Chain (at national level)
Production		Food Nutrition
Farmer skills		Strategy and Policy
Linkages with Value Chain (at provincial level)		

9.1. Strong Impact

Farmers Income. Average farmer income has increased considerably (**Table 5**) by 254% from an average of \$141 per participant to \$500 per participant. The increase is much more impressive in the case of semicommercial/commercial farmers than in the case of homestead farmers. In the case of homestead farmers their income before and after participating in the program went up by 31% from \$116 to \$152; whereas for semicommercial/commercial farmers the income went up by 237% from \$200 to \$674.

Table 5 Change in Margins by Type of Farmers

	Before (2015)		After (2020)		% Increase	
	Participants	Margins/unit (\$)	Participants	Margins/unit (\$)	Participants	Margins/unit (\$)
Homestead	2055	116	3403	152	66%	31%
Semi-commercial / Commercial	885	200	6806	674	669%	237%
Total	2940	141	10209	500	247%	254%

Source: Data obtained by SNV on May 2022.

Production. We do not have production data for all the participants. However, during key informant interviews and focus group discussions, respondents have indicated that production went up by more than 100% during the period of participation in the program.

Farmer skills. Thanks to participation in CHAIN, farmers acquired skills in a number of activities related to the horticultural sector. These included specific technological skills (drip irrigation, mulching, solar pump, greenhouse, ...); value chain skills such as establishing trusting relationships with other actors in the value chains, both horizontally in the value chain (with other farmers) and vertically (with input traders and output traders); production planning skills (recording in the logbook and coordinating planting decisions with market information); food safety skills like choice of chemical to apply; and water management.

Linkages with Value Chain (at provincial level). Through the market linkage approach, CHAIN has been successful in establishing strong and lasting linkages between producers participating in the project and local traders at the provincial level. Both farmers and traders have been involved in

periodic meeting with each other to exchange information about products, technologies, and market requirements.

9.2. Moderate Impact

Food Safety. Although the awareness of farmers about food safety has improved and farmers have learned production techniques and postharvest technologies that contribute to improved food safety, the overall impact on food safety is still moderate. Very few farmers have been able to submit applications for standards such as CAMGAP, CAMORG, and PGS; and a few of them have been certified. For example, one farmer in Stung Treng and two farmers in Kratie have been GAP-certified vegetables producers. By the end of 2022, there could be further progress on these statistics.

9.3. Not Appreciable Impact

Linkages with Value Chain (at national level). Once production volumes have increased, several farmers and traders have started considering exporting to other provinces or also to neighboring countries. In some cases, they have been successful; however, in most cases, they have encountered considerable difficulties in establishing stable commercial relations with larger players at the national level such as supermarkets, wholesalers, or exporters. The reasons for these difficulties are various and include: lack of sufficient aggregation volumes of produce to attract a permanent interest of a larger actor in the value chain; lack of storage facilities (particularly controlled atmosphere or CA storage) that would allow to smooth sharp market price fluctuations, particularly at harvest time; lack of adequate logistics (particularly refer trucks) that would ensure optimal postharvest conditions for the produce to arrive in a proper and attractive condition at the final consumer.

Food Nutrition. Impact on nutrition has been to increase awareness on nutrition diversity and the importance of vegetables in the diet. The evidence on impact on nutrition is very limited. Diet diversification does not seem to have occurred, although overall probably nutrition has improved due to higher quantities of food consumed. It is not clear if the same impact could have been achieved anyway, independently of the program intervention on nutrition.

Strategy and Policy. CHAIN had promoted a number of activities and interventions in support of elaborating provincial strategies and a national policy for horticulture. The impact on both has been rather limited, perhaps because of limited dedicated human resources to that scope. Given the current status and that the project is approaching its ending, nothing much can be done in this respect as developing strategy and policy is time consuming and the process has to follow, oftentimes, government's defined procedures and formats. In addition, as de-concentration is in the making for sectoral agencies such as PDFFs any resulting sub-national strategies/policies they produce at this moment may be wasted as the de-concentration effort may dictate as to how the sub-national budgeting, planning, and strategy/policy-making should be done. For sure, MAFF will always request that sub-national strategies/policies be aligned with its national level strategies/policies; and that could influence how the budget would be allocated.

9.4. Key Aspect 12

Key aspects based on DAC Criteria	Evaluation (Score)
The extent to which the intervention generated or is expected to generate 'higher-level effects' as defined in the design document of the intervention.	Satisfactory (2)

Overall, the project has achieved its defined impacts. Nevertheless, the achievements differed in different phases. If by “higher-level effects” we consider income and nutrition, in Phase 1, its impacts were behind its ambitious targets. In the latter phases, as the targets were adjusted, its impacts were more than its expectations, specifically as regards incomes of its target groups. The impact on nutrition of the target groups was limited, and in Phase 2 was not measured.

10.SUSTAINABILITY

10.1. Highly Likely to Continue and Improve

The following achievements of CHAIN:

- **Production skills**
- **Technology adoption**
- **Productivity gains**
- **Income growth**

are likely to continue and sustain after the end of the Project. Farmers have already seen the impact of improved production skills and technology on increasing their income and reducing their labor input. They will continue to apply their acquired skills, using the new technologies introduced by CHAIN, and resulting in productivity gains that will translate into income growth.

Linkages with local/provincial traders have already been established and proved to be useful to all parties involved, therefore they are likely to continue into the foreseeable future.

Technically capable staff in PDAFFs have been trained and tested during implementation of CHAIN. Many of them will remain in the respective departments for the foreseeable future, particularly the officers that were junior officers when CHAIN was started and had the chance of applying the new technological packages and market system approach of the project. During 2022, the staff will continue project activities with greater involvement of PDAFF/GDA.

Integrated Water Resource Management (IWRM) roadmaps that were developed for certain communes will continue to be the basis for improvement in water management in those communes.

10.2. Unlikely to Continue: Requiring Support to Continue

Adoption and certification in CAMGAP/PGS/CAMORG. The initial effort in training farmers in good agricultural practices (CAMGAP) and organic agriculture (CAMORG, PGS) need to be continued and sustained in order to ensure that the practices are known and adopted by the farmers, and lead to certification. The certification will not happen without a strong support in terms of capacity building of farmers and improved incentives derived from higher prices/returns from certified products.

Upgrading along the value chain (emergence of Horticulture companies and/or AC). Based on the commercial network present in the established 14 Clusters, it is possible that some upgrading along the value chain, in the form of agricultural cooperatives (AC) or horticultural companies, will emerge in the foreseeable future. That will require some support in terms of capacity building and some financial support to the initial investment of the new enterprises. In particular, support will be needed to build management capacity and acquire business skills in inventory management, cash flow management, and production and marketing plan. Access to finance will be needed for logistics investment (warehouse, CA storage, refer transportation, packhouses)

Provincial and National Strategies. Although there has been work already done both at the level of provincial strategies and at the level of national policy for horticulture, the finalization of these documents, especially the national policy on horticulture, might require further support in terms of process and human resources. Specifically, both national and provincial strategies should stress the need of a modern wholesale market (possibly around Phnom Penh and Siem Riep) linked with modern retail markets in the provinces.

The sustainability of knowledge products such as:

- **Technical manuals (30 technical bulletins, 6 manuals) on E-library MAFF**
- **Youtube instruction movies and FB horticulture in Cambodia**
- **How-To-Guides (8)**

depends on their continuous upgrading and maintenance of social networks that have been established. This could be done in collaboration with the knowledge management center at MAFF.

Soil testing and vegetable quality testing centers. Some of them were established in some provinces (Stung Treng and Oddar Meanchey) but more centers need to be created in the remaining provinces and endowed with instruments and tools and human resources to continue their key function in improving the food safety and quality system.

10.3. Key Aspect 13

Key aspects based on DAC Criteria	Evaluation (Score)
The extent to which partners are capable and motivated (technical capacity, ownership) to continue activities contributing to achieving the outcomes.	Highly Satisfactory (1)

GDA, especially the Department of Horticulture and Subsidiary Crops, and PDAFF have the capacity and motivation to continue activities contributing to achieving the outcomes. As the activities of CHAIN are fully aligned with the current policies and orientation of GDA and PDAFF and the market system approach of CHAIN is compatible with MAFF policy, there are excellent condition for partners to continue activities of the project.

10.4. Key Aspect 14

Key aspects based on DAC Criteria	Evaluation (Score)
The extent to which partners have the financial resources to continue activities contributing to achieving the outcomes.	Unsatisfactory (3)

Despite its danger, COVID in Cambodia seems becoming another epidemic disease. Although it had a negative impact on the CHAIN farmers, such an impact was brief and none of the respondents interviewed do not seem concerned anymore, according to interviews with traders, village heads, PDAFFs and project people. Nevertheless, the COVID crisis has put an enormous burden on government finance and during 2021-2023, most of non-health related public expenditures (including agriculture) will be severely affected. That implies that while some capacity building may be continued after the end of CHAIN, others might need to be greatly reduced or discontinued. The activities involving some degree of cofinancing of investment and entrepreneurial activities might be the first candidate for discontinuity. Other important activities such as support to standards certifications (CamGAP, CamOrg, laboratory capacity and operation, etc.), cooperative strengthening/development, and provincial multi-stakeholder platforms will require funding in the immediate to short terms. Some

of the required funds for these important activities might be obtained through national programs such as ASPIRE and new programs currently under conceptualization and at design stage.

10.5. Key Aspect 15

Key aspects based on DAC Criteria	Evaluation (Score)
The extent to which contextual factors (e.g. legislation, politics, economic situation, social demands) is conducive to continuing activities leading to outcomes.	Unsatisfactory (3)

While the regulatory and policy environment are favorable to continuing the activities pursued by CHAIN, there are concerns related to the economic outlook and global environment. Globally, the COVID pandemics has not yet fully been controlled, and, although the situation appears to move towards some degree of control in more advanced economies, there are still uncertainties related to the situation in PRC and most of developing world. New lockdowns might be unlikely but they are not completely to be excluded. That will affect global supply chains and international travel; in turn, that will affect the inflow of resources such as those coming from the tourist industry. Moreover, the global impact of the war in Ukraine are already felt particularly in the energy sector (with all implication for the fertilizer industry) and in the food industry (with increase in the price of cereals). The impact on Cambodia agriculture is highly uncertain as the country could either benefit, as a net exporter of food, especially non-perishable ones and fruits such as milled rice, mangoes, longan; or be negatively affected, as a net importer of energy and agricultural inputs.

11. COST BENEFIT ANALYSIS (CBA)¹²

Cost Benefit Analysis (CBA) was conducted using data on the farmers and traders from CHAIN. The data include the annual change in the number of partners, and the revenue, costs, and margins for specific years. The CBA analysis computed the return to the project investment by comparing the margins obtained by farmers and traders to the expenditures of the project. Multiple scenarios were tested during the analysis, related to the use of the nominal and price index adjusted margins, the inclusion of output traders, and change in the duration of the process aiming to increase margins from the adoption of innovations and modern technologies from CHAIN. Separate analyses were conducted for homestead and semi-commercial and commercial farmers.

The main results are:

- (1) **The project, in its entirety, gets positive returns higher than the prevailing financial interest rate in Cambodia.** Independently on the use of nominal or adjusted margins, the Internal Rate of Return (IRR) is above 24%, which corresponds to Net Present Value (NPV) of US\$2.08 million, and Benefit Cost Ratio (BCR) of 1.31. Investment in horticulture is an opportunity for increasing the income of smallholder farmers, at least those willing to be professional horticulture farmers who received on average an additional US\$474 per year per farm.
- (2) However, **the choice of the beneficiaries matters.** Working with homestead farmers is not cost effective for the project. Out of the 3 scenarios for homestead farmers tested¹³, only 1 presented positive but low NPV (US\$ 49,210), and IRR of 18% and BCR of 1.07. The other

¹² The full report has been submitted as ACI, Cost Benefit Analysis for CHAIN project. Prepared by Agrifood Consulting International, May 2022.

¹³ The parameters used are (i) Nominal prices, (ii) one-year adoption, (iii) share of expenditures allocated to homestead farmers respectively set to 10%, 20%, and 30%.

scenarios showing negative NPV, low BCR (between 0.36 and 1.07) do not meet the threshold of a good project investment, .

- (3) On the other hand, highest returns are observed for semi-commercial and commercial farmers, independently on the delay in attaining the optimal margins from horticulture farming. NPVs are all positive and above US\$4.53 million, with IRR between 58% and 173%, BCR between 2.14 and 2.62, all with the assumption of 60% of total project expenditures allocated to semi-commercial and commercial farmers. To assess the validity of the results, a set of sensitivity analysis were conducted using different share of the project expenditures¹⁴ allocated to semi-commercial and commercial farmers. Under these scenarios, the NPVs remain positive (with high share of investment set at 80% for semi-commercial and commercial farmers) above US\$3.2 million, which correspond to IRR between 36% and 58% and BCR between 1.61 and 2.14.

12.SUCCESS STORIES

The Evaluation Team has met over hundreds project beneficiaries in the 4 provinces. Wherever the team has encountered implementation partners, business actors, and farmers, the Team has listened to a strong positive response to the project. Most beneficiaries were enthusiastic about what they have learned from the project and almost all of them pointed out to their improved situation in terms of various indicators such as income, empowerment, self-confidence, awareness about nutrition and food safety, labor saving technologies, linkages with other actors in the value chain, etc.

The success stories in this section highlight only a very small sample of the numerous success cases that have been encountered during the 8 years of the project and documented in annual reports and previous internal evaluation reports.

The main interest of the success stories reported in this session is in pointing out new directions towards not only sustainability of the gains of the project but also towards scalability and replicability.

12.1. Success Story 1. From Traditional Rainfed Production to Modern Year-round Production in Oddar Meanchey

Nget Savoeurn is a highly successful farmer in Oddar Meanchey. He was involved with CHAIN from the very beginning of the project and also his wife was involved as a leading trader of vegetable products. Together, they run a business that supplies vegetables to Oddar Meanchey province and other provinces of Cambodia.

¹⁴ Share of expenditures for SCC set at 60%, 70%, and 80% respectively for scenarios SCC 3, SCC 4, and SCC 5

Mr. Savoeurn was selected as a leading farmer by CHAIN and was involved in demonstrations and training other farmers in his farmer group and cluster. At the beginning of the project in 2015 he was cultivating about 2 ha of vegetables and now the cultivated area has reached 4 ha. He has experimented and adopted new technologies thanks to CHAIN. From sprinkler he has moved to drip irrigation with considerable saving in water resources and time; he has adopted mulching sheets to control weeds without the use of chemicals; and most recently he has invested in greenhouses that allow him to have year-round cultivation of vegetables. So far, he has invested in two greenhouses (one with cost sharing from CHAIN and the other with financing from ASPIRE). The farmer wants to establish other 3 greenhouses in the near future. Each greenhouse is about 250 m² and cost about \$4,000. But they can generate \$5,000 per year. The system of greenhouse will allow him to go completely organic and have production of vegetables all-year around. He has also plan to raise vegetable beds so that he can cultivate on his land even during the rainy season. Together with his wife he is trying to establish long-term contract with large buyers from other provinces, but there are difficulties related to the trust relationships and highly variable prices. He will continue to be active in his cluster even after CHAIN ends. GIZ has asked him to be a lead farmer and trainers, and he is already involved with ASPIRE.



12.2. Success Story 2. From traditional farmer to CAMGAP farmer and trader

Mr Som Sokneng joined CHAIN as a participating small farmer since Phase 1 of the project and received technical training on irrigation, seeds, land preparation. The training became more intensive during Phase 2, when he also received training to become a trader. The intensive training in production technology allowed him to increase his productivity considerably and to engage in the production of varieties such as cherry tomatoes and onions. On one (1) ha of cultivated land he is able to do year-round cultivation using cycles of 4,000 m². During each cycle he can get an income of about Riel 10 million (about USD 2,500) and he undertakes 3 cycles per year for a total of Riel 30 million income. As a small trader, he can get a profit of about \$25/day. He produces his own vegetables and buys regularly vegetables such as cucumbers, pumpkins, sweet potatoes locally. His sales are at two levels. First, he exports his own products to Phnom Penh (following standards as per CAMGAP). Second, he sells in the province products collected from other farmers. He can sell to Phnom Penh because he follows CAMGAP standards, but other farmers have difficulties in complying with production planning according to CAMGAP standards. His experience with CHAIN is



highly positive as he has learned new technical skills in production planning, has established network with other farmers and traders, and has had the opportunity of training as trader. His current trade is done with the help of a motorbike and Remok (trailer) and his procurement area is limited to his local commune and district. He wants and could expand trade to other provinces, but he would need to improve his logistics endowments; most of all he would need a small refer truck (estimated cost \$13,000) to facilitate the transportation of fresh vegetables over larger distances. But he cannot secure credit from banking institutions since he does not have collateral (the land that he cultivates belongs to his parents in law).

12.3. Success Story 3: From a part-time semi-commercial vegetable grower to a well-known eggplant grafter and vegetable seedling producer.

Mr. Khin Laut lives in Padeum village of Samkhuy commune in Sesan district of Stung Treng province. He used to be a part-time semi-commercial vegetable farmer before CHAIN arrived. His participation in the project since its beginning has proven to be a game changer. He is now a well-known eggplant grafter. He is a lead farmer and produces eggplant seedlings on order from members of his cooperative and some other farmers. He also grows other vegetables seedlings for sales on order. Currently he does not grow vegetables anymore; only his wife and son do. He has just set up a brand-new agro-input retail shop on his property where he also hosts his cooperative office.



Mr. Khin, in his late 60s, felt so confident that his businesses and cooperative will continue even without the project. He is confident that PDAFF will continue its irregular support to him and his cooperative in terms of technical capacity strengthening; and given that his family has built a good and trusted relationships with both input and output traders, his businesses and his cooperative will flourish. With his new business venture in agro-input retails, Mr. Khin gets all his supplies on credit from his trusted input trader in Stung Treng province, Ms. Sroy Theara.



Mr. Khin proudly claimed that his new biz will grow quickly as (a) his cooperative members trust him and the quality of inputs and supplies from Ms. Sroy, (b) farmers do not need to bother bargaining for prices as price tags/prices are placed/written on the packs/packages of the inputs and supplies (fertilizers, seeds, plastic mulches, drip materials, greenhouse nets/plastic sheets, etc.) he keeps, (c) his prices are the same as the prices of Ms. Sroy, and of other retailers in Stung Treng town market, and (d) they can save lots of time for other activities as they do not have to travel kilometers to Stung Treng market for their agricultural inputs and supplies.

12.4. Success Story 4: From Small Producer to Important Traders with National Linkages

Mrs Lay Symean is a super energetic farmer and trader that has been involved with CHAIN since Phase 1. From an initial one (1) ha of land, she is now cultivating 4 ha. She has been an enthusiastic learner of production techniques introduced by CHAIN and has benefited from co-share investment in drip irrigation, pipe system, solar pumps, and land preparation equipment. She is particularly fond of production planning approach and she has compiled several logbook for monitoring purposes. She has followed CAMGAP standard and submitted various samples (soil, water, and products) for getting certification (still waiting for the outcome of the evaluation by GDA). She has played in key role in advising other farmers in terms of inputs and cultivation techniques. She has developed her trading with customers within the provinces and also with customers outside of the province including supermarkets (AC, Macro, Baitong) and contracts with Lily. She knows how to make good profit from vegetable farming and is eager to share her knowledge with her fellow farmers. Her own daughter is engaged in a large agricultural input trading business so that the family (particularly the women side of the family) is being establishing a sizable group of agribusiness companies (farming, vegetables trading, and agricultural input trading). She is worried about the imminent end of CHAIN and she has shown herself ready to continue the work done in the past, but she is not sure who will be the partners in charge.

12.5. Success story 5: From a Subsistence Input Retailer to a Prominent Input Wholesaler-cum-Retailer.

Ms. Sroy Theara, now 40 years old, has been with CHAIN for 6 years. She lives in Stung Treng town of Stung Treng province. When she was approached the first time by the project, she was very reluctant to participate as she thought it could be just a waste of time. However, she accepted to attend the first meeting with farmers. From then on, she continued to participate in various events and training activities by the projects, and those organized by PDAFF and the Department of Agricultural Legislation (DAL) that is in charge of regulating and enforcing agricultural input quality and standards. Prior to being part of CHAIN, she participated in any events by PDAFF/DAL with reluctance; however, her behavior has changed now – she considers them very important.

Prior to actively engaging herself with CHAIN, Ms. Sroy was a small agricultural input and supply retailer. With a net profit of 100,000 Riels per day on average, her business has ensured a subsistence level for her family. After joining CHAIN, the business has grown significantly. During the COVID-19 pandemic in 2020/2022, she was still capable of getting substantial income from input selling activities. She reported, with a big smile, that her total daily sales range from 10 million Riels to 40 million Riels. With such amount of sales, her net profit is between 1.2 million and 4.1 million Riels/day. She claimed with pride that her input selling business will continue to grow in the future because she (a) has established constructive, trustful and beneficial relationships with farmers and their groups or cooperatives in various districts facilitated by the project and PDAFF, (b) believes that demand for locally produced vegetables will continue growing, and (c) can assure quality of her agricultural inputs and supplies.

12.6. Success Story 6: From a Homestead Vegetable Farmer and Construction Worker to Vegetables Retailer.

Ms. Yann Sopheak and her husband were construction workers. Her family was poor. They worked in construction industry for daily wages on which her family survived. She also grew some vegetables for home consumption, and sometimes for sales in case of excess production. In 2016, she was decided to join CHAIN. Her participation in the project changed her life and her family livelihoods. Her husband and she abandoned their unstable, daily construction jobs completely. They started to be actively engaged with the project and devoted full time to vegetables production and marketing. With support from the project, she has established, and run a vegetables stall in Samaki Market in Kratie town in the province of Kratie. Meanwhile, her husband continues planting vegetables for sales and helps collecting from other farmers. The village head of Kambor village in Kratie province is proud of the accomplishment of Ms. Yann and her family, who are now running two vegetables stalls.

Before joining the project, Ms. Yann could make 20,000 to 30,000 Riels/day from her vegetable activities, but the earning was not regular. She could earn that much when she had surpluses from homestead garden for sales; and such surpluses were seldom. Currently, she earns between 70,000 and 80,000 Riels per day. She claimed that her products are popular among wealthy customers in town, and sometimes she is unable to meet their demand. Also, she regularly sends vegetable products to her children and relatives who live in Phnom Penh for their consumption. She is convinced that demand for her products will continue to grow; but she is worried about production seasonality and quantity adequacy.



13.LESSONS LEARNED

13.1. What could have been done MORE?

Irrigation: Given the orientation of the project to the horticultural sector, it was evident since the beginning of Phase 1 that without adequate and reliable access to water, cultivation of vegetables would be heavily hampered. This realization was translated into several interventions that came to fruition in Phase 2 and Phase 3. The interventions were highly successful. However, they could have started earlier than the second and third Phases and result in greater impact. Moreover, the investment associated to these interventions (through cost-sharing in irrigation piping systems, wells, solar pump, etc.) could have been higher, to further increase impact. Without a cost sharing by the project, the initial investment in solar pump systems would not have been accessible to the vast majority of farmers.

Standards (CAMGAP, CAMORG, PGS). The number of farmers trained in standards and certified could have been higher. This is partly related to the choice regarding the types of beneficiaries reached and the geographical spread of beneficiaries. The decision to reach many homestead farmers and to spread the intervention over a wide territory made the capacity building less effective in terms of training farmers in standards up to the level of achieving certification. With a lower number of beneficiaries more concentrated geographically, and more emphasis on commercialization from the beginning (without the need of separating homesteads from other groups), the outreach of standards certification would have been larger.

Logistics. There was hardly any intervention aimed at improving storage of farmers. No intervention on logistics (for example facilitating access to finance to get small refrigerators for traders) or larger warehouse, or even Controlled Atmosphere (CA) storage for traders. In the absence of these logistics improvements, the linkages to more substantial actors (supermarkets, large wholesalers) in the national value chain would not be possible.

13.2. What could have been done LESS?

Number of beneficiaries. The project reached about 10,200 farmers beneficiaries in 2021, including 3,400 homestead farmers, and 6,800 semicommercial farmers, and commercial farmers. Moreover, the distribution over different phases (higher percentages of homestead farmers at the beginning in Phase 1) resulted in a difficult and harder tasks in the beginning Phase 1. A lower number of beneficiaries could have improved the project's results.

Number of villages. The number of villages (259 according to CHAIN 3 documents and inputs) was too high. The high number made precluded from reaching an adequate concentration effort. Moreover, the villages were spread out, resulting in a less frequent visits, and more expensive interaction between service providers and farmers. The number of target beneficiaries and districts in sparsely populated provinces stretched the already thin project resources and compromised its effectiveness and results.

Nutrition intervention could increase nutrition awareness about the need to consume more vegetables among households. However, it is not clear how much overall nutrition had improved because of the interventions. Also, it is not clear why the nutrition intervention was dismissed if it was considered successful. After all, without appropriate nutritional survey of the target population, it is hard to say if the intervention is useful at all, even if vegetable consumptions have increased and household's diet became more diversified.

13.3. What could have been done BETTER?

Selection of beneficiary farmer groups (one category rather than 3 categories). The early decision of selecting three groups of beneficiaries (homestead, semicommercial, and commercial) was undertaken at the beginning of the project with the intention of targeting some of the poorest households and more subject to malnutrition. At the same time, there was an orientation towards a value chain approach. The inclusion of homestead farmers was not fully consistent with a value chain approach. Moreover, the effort in reaching homestead farmers was not cost effective and probably the outcomes could have been reached in other ways. The decision of focusing on semicommercial and commercial farmers during Phase 3 was perhaps a bit late, but very important correction in the strategy. Probably, the early focus only on semicommercial and commercial farmer would have resulted in stronger impact on farmers income and a value chain more integrated at the national level.

Provincial Strategies. The Evaluation Team did not perceive a clear articulation of Provincial Strategies with the possible exception to Oddar Meanchey. Yet, provincial strategies could be essential inputs in the decentralization process being undertaken by Cambodia Additional human resources to support the PDAFF in the formulation of provincial strategies could have been warranted if the outcome were a better articulated document.

Communication and Marketing. Communication between the Project and stakeholders could have been improved. The Evaluation Team received confused information from key stakeholders (eg a number of village heads of participating villages argued that they never heard of the project/CHAIN 1, CHAIN 2 or CHAIN 3 and they are not aware that their citizens have participated in them) about the project; provincial coordinators were not clear about the impact of the project in terms of impact on income; key innovations and tools such as logbook did not have the visibility that they deserved. Although the Evaluation Team witnessed excellent results from CHAIN in the field, sometimes sign board and other marketing material seem to be reticent to show attribution of results.

14.CONCLUSIONS

Here we summarize the main conclusions and provide recommendations for the formulation of future project (such as NURTURE)

CHAIN has been successful project in creating impact on income of its beneficiaries. It has shown that vegetable production can be highly profitable even for smallholder producers. This was relevant to the needs and priorities of beneficiaries and coherent with both internal strategies of SDC and Government policies and orientation. The project was effective in reaching most of its outcomes and relatively cost effective.

Although the Cost Benefit Ratio is comfortably above 1 and internal rate of return is strong, the cost effectiveness of intervention varies considerably between groups of beneficiaries. There is much higher cost effectiveness and impact for semicommercial and commercial farmers than for homestead farmers. This raises the question for future program design to define in advance the target group and the metrics of evaluation and the approach. If the metrics of evaluation is based on income and the approach is value chain development, then homestead farmers might not be the best choice for the target group.

Any future projects must be distinctive, for example, economic development/income-promotion projects vs. social development/nutrition-oriented/health projects, so that targeting, and

implementation approaches can be simplified and impacts, efficiency and effectiveness can be optimize. In other words: make goals and design simple.

In terms of sustainability, the project has several elements that will assure the continuation of some activities and gains at the local (provincial) level. However, there are a number of activities that will not be sustainable unless resources are dedicated to their further development. These activities are related to standards and certification, integration with national actors, and increased competitiveness and quality of vegetable production.

Structural investments consistent with the Horticultural Policy still in preparation will have to be made for ensure that these activities are sustainable. In order to promote sustainability, any future projects must have built-in sustainability measures in the design and appropriate exit strategies should be crafted and implemented at least one year before the projects end.

ANNEX 1: PROJECT PASSESSMENT GRID

Assessment Grid for project/programme evaluations of the SDC interventions

Version: 30.06.2020

Note: this assessment grid is used for evaluations of SDC financed projects and programmes (hereinafter jointly referred to as an 'intervention'). It is based on the OECD Development Assistance Committee evaluation criteria.¹⁵ In mid-term evaluations, the assessment requires analysing the likelihood of achieving impact and sustainability. All applicable sub-criteria should be scored and a short explanation should be provided.

Please add the corresponding number (0-4) representing your rating of the sub-criteria in the column 'score':

- 0 = not assessed
- 1 = highly satisfactory
- 2 = satisfactory
- 3 = unsatisfactory
- 4 = highly unsatisfactory

Key aspects based on DAC Criteria	Score (put only integers: 0, 1, 2, 3 or 4)	Justification (please provide a short explanation for your score or why a criterion was not assessed)
Relevance Note: the assessment here captures the relevance of objectives and design <i>at the time of evaluation</i> . In the evaluation report, both relevance at the design stage as well as relevance at the time of evaluation should be discussed.		
1. The extent to which the objectives of the intervention respond to the needs and priorities of the target group.	2	The objectives of the intervention were to increase income and nutrition from horticultural products and trade. This was relevant to the target population in the four target provinces. It was remarkable that the choice of the horticultural sector, although not the priority choice for alleviating poverty in those provinces at the time Phase 1 was designed, revealed itself later to be a good choice as the project unfolded.

¹⁵ For information on the 2019 revisions of the evaluation framework see: Better Criteria for Better Evaluations. Revised Evaluation Criteria. Definitions and Principles for Use, OECD/DAC Network on Development Evaluation, 2019.

2. The extent to which the objectives of the intervention respond to the needs and priorities of indirectly affected stakeholders (not included in target group, e.g. government, civil society, etc.) in the country of the intervention.	1	The objectives of the intervention were highly relevant to the priorities of government, civil society, and a growing segment of the urban consumers with an increasing concern for food safety, particularly related to vegetables. The emphasis on horticulture was in line with the drive towards agricultural diversification promoted by in the Crop Sub-sector Strategic Development Plan 2019-2023.
3. The extent to which core design elements of the intervention (such as the theory of change, structure of the project components, choice of services and intervention partners) adequately reflect the needs and priorities of the target group.	2	The interventions including capacity building, market development, and smart water management reflected the needs and priorities of the target group. The emphasis on water management became more noticeable in the project design during Phase 2 and particularly during Phase 3. Interventions related to access to finance were limited.
Coherence		
4. Internal coherence: the extent to which the intervention is compatible with other interventions of Swiss development cooperation in the same country and thematic field (consistency, complementarity and synergies).	1	CHAIN is fully consistent with the thematic domain of SDC strategy in Cambodia. Moreover, the project is complementary and synergetic with other programs of both SDC such as Partnership for Forestry and Fisheries (PaFF) and other partners such as Support for regional economic development (RED) together with the German Federal Ministry of Economic Cooperation and Development (BMZ).
5. External coherence: the extent to which the intervention is compatible with interventions of other actors in the country and thematic field (complementarity and synergies).	1	Fully coherent with the <i>Rectangular Strategy for Development, Phase IV 2019-2023 (RS-IV)</i> and the strategic frameworks represented by <i>National Strategic Development Plan 2019-2023 (NSDP)</i> and the <i>Agricultural Strategic Development Plan 2019-2023 (ASDP)</i> .
Effectiveness		

6. The extent to which approaches/strategies during implementation are adequate to achieve the intended results.	2	The capacity building strategy based on field school approach and implemented through PDAFF and NGO partners was highly effective and was reinforced by the Market Linkages approach and Markets for the Poor approach. The emphasis on integrated water management and use of smart water solutions that characterized later Phases of the project was highly appreciated by farmers and contributed to labor saving practices and increasing productivity while improving resilience to climate change. The approach to food safety was to ensure more awareness of the issue of food safety, standards and requirements (CAMGAP and CAMORG) for organic food production.
7. The extent to which the intervention achieved or is expected to achieve its intended objectives (outputs and outcomes).	2	Most interventions were very appropriate to achieve intended objectives. Only in the case of nutritional objectives, the approach and interventions seem to have been less effective in achieving objective and the interventions were discontinued in Phase 2.
8. The extent to which the intervention achieved or is expected to achieve its intended results related to transversal themes.	1	Most interventions were appropriate to achieve intended objectives and the transversal themes of gender empowerment, climate change resilience, and disaster risk reduction.
Efficiency		
9. The extent to which the intervention delivers the results (outputs, outcomes) cost effectively.	2	The cost benefit ratio (CBR) for the project has a satisfactory overall value of at least 1.31. However, the situation is quite different when considering different groups of beneficiaries. The CBR in this case could be even less than 1 for HS farmers whereas could reach level of 2.6 for semicommercial and commercial farmers. That suggests some inefficiencies in reaching out to the HS farmers. Their improvement in income was marginal and not sufficient to either justify the economic investment or the impact on the affected farmers.

10. The extent to which the intervention delivers the results (outputs, outcome) in a timely manner (within the intended timeframe or reasonably adjusted timeframe).	2	The project interventions have delivered results in a timely manner. Slight delays might have occurred during 2020 early COVID experience, but the project recovered relatively quickly.
11. The extent to which management, monitoring and steering mechanisms support efficient implementation.	2	Management and steering mechanisms were very supportive and flexible. Monitoring was a little complicated and not clearly communicated.
Impact		
12. The extent to which the intervention generated or is expected to generate 'higher-level effects' as defined in the design document of the intervention. Note: when assessing this criterion, the primary focus is the intended 'higher-level effects'. In the event that <i>significant</i> unintended negative or positive effects can be discerned, they must be specified in the justification column, especially if they influence the score.	2	Very satisfactory in terms of income effect. Less clear the impact on nutrition in the absence of a well-defined monitoring system to assess nutritional status.
Sustainability		
13. The extent to which partners are capable and motivated (technical capacity, ownership) to continue activities contributing to achieving the outcomes.	1	GDA, especially the Department of Horticulture and Subsidiary Crops, and PDAFF have the capacity and motivation to continue activities contributing to achieving the outcomes. As the activities of CHAIN are fully aligned with the current policies and orientation of GDA and PDAFF and the market system approach of CHAIN is compatible with MAFF policy, there are excellent condition for partners to continue activities of the project.
14. The extent to which partners have the financial resources to continue activities contributing to achieving the outcomes.	3	COVID crisis has put an enormous burden on government finance and during 2021-2023, most of non-health related public expenditures (including agriculture) will be severely affected. That implies that while some capacity building may be continued after the end of CHAIN, others might need to be greatly reduced or discontinued. The activities involving some degree of cofinancing of investment and entrepreneurial activities might be the first candidate for discontinuity. Other important activities such as

		support to standards certifications (CamGAP, CamOrg, laboratory capacity and operation, etc.), cooperative strengthening/development, and provincial multi-stakeholder platforms will require funding in the immediate to short terms. Some of the required funds for these important activities might be obtained through national programs such as ASPIRE and new programs currently under conceptualization and at design stage.
15. The extent to which contextual factors (e.g. legislation, politics, economic situation, social demands) is conducive to continuing activities leading to outcomes.	3	Global factors (COVID and war in Ukraine) add uncertainty to the global food supply chains and are not conducive to continue activities leading to outcomes.

Additional information (if needed): Click here to enter text.

Title of the intervention: CHAIN

Assessor(s): Francesco Goletti and Srey Cheng

Signature

Francesco Goletti
12 May 2022

Signature

Srey Chanthay
12 May 2022

