Cambodia Horticulture Advancing Income and Nutrition (CHAIN)

End of Phase Two REPORT

December 2017 – December 2020

Implemented by:

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
Confederaziun svizra

Swiss Agency for Development and Cooperation SDC

CHAIN

SNV

swisscontact

Contents

Basic Information

Implementing organisation: SNV Netherlands Development Organisation (SNV) Cambodia	
Project name: CHAIN Phase Two	**Type of report: Operational report CHAIN-2**
Phase duration: 01/12/2017 – 30/12/2020	**Reporting period: 01/12/2017 – 30/12/2020**
SDC Budget Phase 2 (CHF): 4,500,000 Total Expenditure: 4,424,481.28	**Total Budget CHAIN (2014-2022) CHF:** 9,980,000
Main National partners: Provincial Departments of Agriculture Forestry and Fisheries (PDAFF) of Kratie, Preah Vihear, Oddar Meanchey and Stung Treng Provinces Local NGOs: CRDT, KAFDCO, KBA, NTFP RCEDO Private Sector: EWS, NAV, REMIC, EAC	**International Partner:** SwissContact
Author Report: CHAIN Team Rovermars@snv.org	**Receiver of report:** Mr. Sovannarith Hem, Program Manager, Swiss Agency for Development and Cooperation (SDC)
Main Objective of the programme: The overall project goal is to **improve income and nutrition of rural households through safe horticulture production and trade** in the targeted rural provinces (Kratie, Oddar Meanchey, Preah Vihear and Stung Treng) in Cambodia.	
CHAIN-2 is the second phase of an 8 year programme. The follow up phase CHAIN-3 consolidates the results of CHAIN-2 and focuses on government handover and capitalisation of the experiences / knowledge harvesting. COVID has affected the last year implementation of Phase-2.	

Strategic review & outlook

Developing functioning input and output markets, establishing commercial relationships, and generating trade and income opportunities in an inclusive way is possible, even in the 4 most remote and poor provinces of Cambodia. Inclusive horticultural market systems development is bringing real incomes and real change to households.

CHAIN-2 has used a business-to-business (B2B) market systems approach with farmer groups and SMEs, facilitating improved production and market linkages, in coordination with provincial governments. The central government of Cambodia has taken a keen interest in how this was done, and would like to replicate this in other programs. For CHAIN-3 SNV has signed an MoU to this effect with the General Department of Agriculture (GDA) of the Ministry of Agriculture, Fisheries and Forestry (MAFF). Various development partners expressed an interest in a better more practical market systems development approach. CHAIN-3 is planning to capitalise on the experiences of the CHAIN project to date, producing a number of participatory knowledge and dissemination products to this effect. Climate change will affect the productive capacity of Cambodia's farmers with a projected increase of floods and longer droughts. To respond effectively to the impact of such natural disasters it is important to create more resilience, both at farm level but also in the market system.

CHAIN-2 has done a short pilot on this theme with encouraging results and CHAIN-3 will further build on these focusing on water resources and management, whist consolidating the market system results of CHAIN-1 and 2. The COVID pandemic was managed well in Cambodia but had a devastating impact on its economy (tourism, and remittances from foreign workers). COVID restrictions will affect the implementation of the CHAIN-3 programme and more adaptive ways of working, flexibly responding to opportunities and challenges is even more necessary. We would like to thank SDC for giving this option to operate flexibly and for their commitment to long term funding which is necessary to support market systems to develop.

1. Introduction

Short description of the project/programme and its intervention strategy

The CHAIN project tells a story in three parts. CHAIN-1 started almost from scratch, with mostly only subsistence horticulture production practiced in the 4 poor Northern provinces of Stung Treng, Kratie, Oddar Meanchey and Preah Vihear. CHAIN-1 invested substantially in production techniques / extension, strengthened existing farmer groups and formed new ones, initiated market linkages through the cluster approach and market fairs, strengthened the capacity of public and private service providers to improve on their extension delivery, and supported input suppliers to establish distributions systems. This all to create a critical mass for a market push to supply the local vegetable markets, and a market pull to create aggregate demand for improved inputs (seeds, crop protection, drip-irrigation). CHAIN-1 also did a lot of awareness raising for the consumption of safe vegetables as part of improved nutrition.

CHAIN-2 built on these results, and facilitated deeper and wider improvements in the provincial market systems. CHAIN facilitated the crowding-in of more companies, promoted technologies to facilitate year-round production, especially greenhouses and pilots of smart water interventions, stimulated lead farmers to provide services to their groups, facilitated contract farming with buyers from Phnom Penh, and raised awareness of urban consumers about availability of safer, local vegetables and fruits whilst supporting local traders to step up their business. CHAIN-2 promoted direct farmer service provision through B2B facilitation.

CHAIN-3 will focus on consolidating those activities, test further interventions on climate resilience, and support an enabling environment and hand-over to the government. See Annex A for the Theory of Change logic.

Figure1: The CHAIN strategy in each phase

Evolution of the context and priorities

The COVID pandemic which started in 2020 has impacted the context significantly in which CHAIN operates, and changed the economic growth trajectory of Cambodia and surrounding countries. Cambodia has managed to limit the spread of COVID-19 with strict lockdowns and total border closures. This has led to a dramatic drop in tourism arrivals and a slowdown in GDP growth.

Demand for vegetables in the Siem Reap area has plummeted and this led to a decrease in off take of vegetables of Oddar Meanchey and Preah Vihear, as well as increased competition on local markets (due to the searching of alternative markets for produce coming from other high production areas such as Battambang).

COVID restrictions also impacted the ability of the team to held meetings and field visits in 2020.

CHAIN-2 has piloted Smart Water Solutions to enable farmers to practice year-round production and to be more resilient to climate change. This is in line with SDCs priorities on climate resilience and reduction of disaster risks like droughts. Some COVID emergency support was given with seed multiplication plots, access to inputs and to farmers affected by flooding. It was shown that short cycle crops like in horticulture can help people to recover quickly from disasters by generating quick cashflow.

2. Achieved Impact and Outcomes

The Theory of Change of CHAIN-2: *Farmers will have better access to knowledge on horticulture farming, markets, business opportunities and nutrition, and will improve their productivity and marketing of vegetables through sustainable business relationships with input and technology suppliers, traders and buyers. They will also increase their household consumption of safe vegetables.*

Impact

The **target** for CHAIN-2 is to reach 9,750 farmers, including 1,200 indirect farmers. By the end of 2020, CHAIN **reached 10,209 farmers** of which 73% female farmers and 7% Indigenous Population (IP) in 393 farmer groups. 61% of these farmers were mobilized during the current phase. Homestead farmers were phased out in 2020 and the number of active farmers still continue working with CHAIN-2 and CHAIN-3 are 5,827 farmers (of which 72% female) re-distributed over 301 active farmer groups (237 semi-commercial level and 64 commercial level). See details in **Annex B**).

The project had as assumption that by the end of 2020, 3,150 commercial farmers and 3,100 semi-commercial farmers would have their respective incomes increased. By May 2020, the CHAIN farmer network consists of 80% semi-commercial farmers (4,634 farmers, 72% female, 15.5% women headed HH, 7% IP), and 20% commercial farmers (1,195 farmers 68% female, 14% women headed household, 0% IP). The profiles of the farmers differ within those two categories and depend on the number of crop cycles, the type of crops, technologies, and land size. By team and partner observation in May 2020, most of the farmers grow two to five crop cycles and have a *net* income from vegetable growing ranging from 300 to 1,500 USD annually. Income levels from vegetables were most accurately monitored through the 240 logbooks which famers have kept. Increased acreage and more crop cycles have led to a higher hired labour demand in semi-commercial/commercial farms. However, we have not measured the effect on temporary/part-time employment creation.

The **average annual income from vegetables** of farmers in CHAIN-2:

Type of farmers	**Baseline 2018**		**End line 2020**	
	Gross Revenue ($)	Net income ($)	Gross Revenue ($)	Net income ($)
Homestead	48	35	468	152
Semi-commercial	284	225	1414	461
Commercial	990	793	2026	887

The Gross Revenue is the sales derived from Vegetables. The Net Income is Gross Revenue minus the cash costs of inputs and hired labour. (So own labour and land are not included). Net income is therefore, the return on household labour.

The baseline of CHAIN-2 clearly shows less Revenue and less expense but has high family labour effort. In 2020, farmers invested in technology that increased the expenditure of farming, but less family labour effort. For further detailed results on impact see the table in **Annex C**. Dietary diversity intake for nutrition was not measured in CHAIN-2, however farmer surveys have seen some increase in consumption of vegetables.

The last year of CHAIN-2, which was affected by COVID, has seen a decrease in vegetable offtake and sales, 72% of traders responded in the last market survey that their sales have decreased, signalling the lower sales and hence income for farmers.

2.1 Outcome One: Increased access of gender responsive extension and business development services

CHAIN-2 worked to increase farmer access of gender responsive business development services of private and public sector actors within the horticulture sector. Based on the outcome results achieved to date, in CHAIN-2 the project has facilitated group-level local ownership, improved the partners' capacities, and created B2B linkages between public and private actors to develop the horticulture sector in the four-targeted provinces.

Gender responsive extension and B2B services to farmer groups: CHAIN-2 worked with 393 farmer groups in total. Various graduated over the years or downgraded respectively. 301 active groups have established better market linkages and B2B relationships with vegetable buyers, input providers and public extension, evidenced by their members operating at semi-commercial or commercial levels. Most of the farmers are women.

Graduation process of farmer groups: By the end of May 2020, 176 groups have graduated (135 HF groups and 41 SCF groups), 31 groups downgraded (7 SCF groups and 22 CF groups), and 126 groups are considered inactive (81 HF groups, 40 SCF groups and 3 CF groups). This includes 81 homestead groups that were phased out because no support for homestead activities was planned in 2020. There are also 40 semi-commercial groups and three commercial groups which became inactive. In 2020 CHAIN continued to work with 237 semi-commercial groups and 64 commercial groups.

Increased capacity of private and public sector to provide services: The technical staff of the four PDAFFs, four PDoWAs, five local partner NGOs, CHAIN staff and private sector staff feel more confident in providing quality services to the farmers after extensive training and coaching, contributing to production, market access, nutrition and resilience, of which the last two topics are particularly gender relevant. In 2020, the activities with PDOWA were completed by July 2020.

2.2 Outcome Two: Improved functioning of the horticulture market system through inclusive business

The goal of CHAIN 2 was to increase the market share of locally produced vegetables from 37% to 56%. In the target provinces, we have seen over the project time significant changes: Surveyed traders have seen quantity, quality, diversity, and reliability of local produce all increase over the last three years (see **Annex D** 2020 Market Study). A customer survey in 2020 showed that 99% of customers interviewed believe that there are important benefits associated with local vegetables (as opposed to imports) and 86% of interviewed customers said that they are willing to pay more per kg for local vegetables. A recent market study ending March 2020 (just in between peak and low season) reveals that locally produced vegetables represented average 53% of the market over the four provinces, ranging from 42% in Oddar Meanchey to 55% in Stung Treng. To increase local market share farmers need to think less about competing with imports from other countries (which makes up a small percentage of the vegetables sold in the provinces) and think much more about competing with the vegetables coming from other Cambodian provinces. This intra-province trade heightened due to the COVID tourism crisis reducing demand, and the produce surplus from other provinces, which is seeking alternative market outlets.

National input and technology companies increase market presence in the project area:
The goal was to facilitate market entry for six national level companies in the target provinces to establish inclusive business relationships. This was achieved through formal partnerships with six companies and "crowding in" by others. The three input and technology companies include Angkor Green Investment and Development (AGID), East

-West Seed Foundation (EWSF), and Haolong Mekong (HLM), all of whom have reported their product sales increased in the CHAIN target provinces.

Traders and buyers buying more from CHAIN farmer groups:
The target for CHAIN-2 was to facilitate increased purchasing relationships between 20 local vegetable traders and buyers. The project collaborated closely with 27 traders, 18 of whom signed formal agreements with CHAIN to co-finance capital investments in their vegetable businesses. In total, 65 traders and village collectors bought products from the CHAIN groups. Unfortunately, due to a combination of water scarcity and COVID-19, purchases by CHAIN traders from CHAIN farmer groups decreased from 2019 to 2020. However, the 2020 Market Actor Survey shows that as a result of CHAIN's interventions (and other development initiatives), 80% of surveyed traders believe that farmers can supply larger volumes, 74% believe farmers can now supply vegetables for longer periods of time, 74% believe that quality of local products have increased, and 68% believe that farmers have an improved knowledge on post-harvest handling. See Annex E for the recent market actor survey.

Agribusiness-clusters functioning:
With a goal of six national agribusiness with market linkages in the provinces, the team mobilized 14 farmer clusters in CHAIN-2 to supply national buying companies. Four national buyers, specifically Khmer Organic Cooperative (KOC)/EAC, Natural Agriculture Village (NAV), REMIC, and AgriON Cambodia have linked with 10 vegetable clusters and are buying vegetables (15% of farmers).

Three of the clusters have advanced significantly and formed two agricultural cooperatives (ACs), which will mean more formal membership, governance structures, and administration (of the three clusters, two will merge to form one AC; the third cluster is large enough to form its own AC).

2.3 Outcome Three: Improved enabling environment supporting the development of the horticulture sector

CHAIN-2 supported actively the linkages between market actors and the public sector, thereby creating feedback and information loops to inform and influence policy. We observe also increased institutional linkages between the central ministry of agriculture and provincial departments. With CHAIN-2 support a draft national Horticulture Policy was formulated, as well as provincial strategies. CHAIN-2 contributed to the National Cambodian Good Agricultural Practices (CAMGAP) standards for vegetables and its manuals and led the development of the Cambodian Organic (CAMOrg) standard for vegetables.

A Qualitative impact result study was commissioned to the NGO iDE focusing on significant changes which CHAIN has brought about in people lives. See Annex F

3. Outputs and performance

3.1 Outputs for Outcome One: Farmer Services Provision

Farmer group interventions

In 2020, all homestead groups were phased out. PDOWA continued with the community dialogues on nutrition and gender awareness in some communes. Most direct extension work which the NGOs previously performed were transferred to PDAFF. The intervention for semi/commercial groups really focuses on year-round production, high value crops, and climate resilience adaptation. Technologies for climate resilient production include demonstration of new model greenhouse, pilot smart water solutions, like efficient drip, mulch, sprinkler, solar pumps and water ponds. High value crops include tomato, onion, papaya, watermelon, and sweet melon, especially for commercial clusters with contract buying companies. The B2B has linked all the farmer groups to market actors.

Farmer Groups	Homestead	S-commercial	Commercial	Total
Target	140	151	148	439
Achieved	153	237	64	454

90% of farmers learn most from Trainings, while 50% from visits and from neighbours.

COVID-19 Interventions

CHAIN-2 did various COVID-19 interventions and printed 2,000 Khmer leaflets about COVID awareness measures. The leaflets were prepared with WHO and MoH and distributed in the provinces by partners in March. CHAIN-2 has distributed seed for home gardens through partners to 2,000 households in three provinces (OMC, KRT and STR). CHAIN-2 and partners has co-invested in 75 initiatives for water access (for production/irrigation) with farmers allowing them to produce year-round and supported the PDAFF-OMC to multiply the local vegetable OPV seeds such as long bean, tomato, eggplant and some leafy vegetables.

Lead Farmer Business Incubator Program

Lead farmers lead their cluster groups and provide services to their members, like information, agronomic extension, sales of inputs, aggregation, market contacts and facilitating potential buying contracts. 80 lead farmers have been identified in CHAIN-2, but only 59 lead farmers enrolled in the business capacity building programme. Successfully completing the entrepreneurship skills and basic micro-business management course, farmers were awarded with 250 USD start-up capital to start their business -to continue to provide services to the cluster. 40 lead farmers have started-up their business as input retailers and vegetable traders. 16 Lead farmers with the best business plans got 1000 USD each. See for an assessment of the programme **Annex G**.

GE and WEE

CHAIN-2 has provided refresher training to partners on Gender Equity (GE) and Women Economic Empowerment (WEE). The consultant has adjusted the existing training material and manual and then provided the refresher training in each province (classroom based) for PDAFF, PDOWA, Private sector, and some local market actors, with total participants 84 people including 32 women. One aspect which participants mentioned is the importance of the family households working well together, and that many women who interacted with CHAIN have improved their self-esteem and confidence, and therefore became better producers or retailers. The aim is that actors are taking gender (equality) aspects into account when designing and implementing their activities.

3.2 Outputs for Outcome two: Inclusive Business linkages

Public Private Partnership Collaborations

The team collaborated with ten national companies and signed formal partnerships with seven: AGID, EWSF, HLM, REMIC, NAV, EAC and AgriOn. The agreements support (1) the supply of agronomic inputs and materials, (2) capacity building of partner staff and farmers on production and technology, (3) improving capacity and service delivery of input retailers and (4) buying vegetables from farmers. Four input companies (VAHAI, New Deal Irrigation, AGRIANCE and MSG) have collaborated with CHAIN informally to provide some agronomic and technical extension and have attended the business cluster multi-stakeholder platforms. Moreover, after recognizing the investment potential, other companies have crowded-in to the market and directly approached CHAIN farmers and farmer groups to sell inputs (Sinthen, Mabo, Eargrow, Dong Sun, Champion and Hen Gen) and buy vegetables (Agro-nature, CJ, and Sroksre). 95% of farmers buy their inputs on an individual basis.

Climate Resilience & Farmer-led irrigation in 2020

Through the years CHAIN has implemented several interventions to address water management, including a hydrogeological and irrigation technology market assessment. Other interventions included farm management practices, greenhouse technologies, and different irrigation technologies introduced to the provinces, farm demonstrations, trainings of extension staff, and trainings of local retailers. Additionally, CHAIN supported farmers with access to water by facilitating linkages with the local service provider and co-investment to establish water storage or groundwater extraction infrastructures, mainly ponds and pumps. We realised that a more systemic water intervention is required to support more holistic improvements to address farmers' water challenges for year-round production to make them more climate change resilient. Farmer Led Irrigation (FLI) assessments and pilots therefore were initiated consulting farmers, suppliers, output markets, financial institutions, and knowledge providers. FLI uses a complete package of smart water solutions approaches, including storage, abstraction, conveyance, application, and soil moisture conservation. The assessments identified that CHAIN farmers have a diversity of technologies, practices, knowledge, capabilities, and visions. Thus, solutions should be specified by province, fitting a combination of environment, production availability, crop types, sources of water, and types of farmers.

The pilot was done in Preah Vihear province, consisting of an assessment of the actors, district dialogue, co-investments with 36 farmers willing to establish SWS pilots, Farmer SWS Field School, Smart Farmer Network, Farmer Video competition and additional market output linkages. The SWS pilot interventions included On-farm Storage Pond excavation, bore-hole drilling, solar pumps, electrical pump, elevated water tank, drip-irrigation, smart mobile valve control and water moisture sensors, green netting, and cover crop establishment. The pilot SWS report is Annex H.

Rural Business Accelerator (RBA) Program

10 traders, 6 in STR and 4 in PVH, were supported with basic business capacity building such as business growth strategy, pricing models, record keeping, and accounting by CHAIN and PDAFF, based on the manual developed by SHE investment. The RBA assessment of results is Annex I.

Agribusiness Clusters

CHAIN-2 continued to utilize an agribusiness cluster approach. Mobilization of clusters includes capacity building of stakeholders and a series of multi-stakeholder platform (MSP) meetings. Within the clusters, local input suppliers remain the key resources for improving the farmers' production. Input suppliers have also started to introduce better quality/modern inputs.

Out of the 14 clusters, 10 established vegetable trading linkages with buying companies supplying Phnom Penh. Each cluster collaborates with at least two or three local traders for improving their vegetable business trade and linking with the market stall. To make aggregation and sale of vegetables easier, collection points have been established in ten of the clusters, working though the representative of the cluster. 3 Clusters have transformed into nascent vegetable agriculture cooperatives.

Most of the cluster farmers are selling individually (97%) and not through the cluster collectively (3%). Hence, the cluster's main function, is to facilitate the commercial relation, and not act as collective sales channel. All farmers sell to local buyers, while 15% of them sell to buyers from Phnom Penh. Most of the contacts between farmers and buyers are by telephone, and most of the market information is obtained from traders. Most of the farmers have no (informal) contract with any of the buyers, meaning they are free to sell to any buyer.

The results of the cluster assessment is Annex J.

Local safe vegetables market strategies

In 2019 CHAIN-2 introduced the market-stall, a modern kiosk-style vegetable booth where local safe vegetables are sold. In 2020, CHAIN-2 supported three additional market stalls – one in Kratie, one in Oddar Meanchhey and one in Stung Treng – with the same business model as Preah Vihear. 16 marketing events to boost local awareness on safe, clean vegetables from local suppliers were organized around the 4 market. It is expected that the market stalls will further increase consumer awareness and demand for local vegetables, and on practices for hygiene and food safety (treating the vegetables before sale with Ozone to kill any germs, placing vegetables not on the ground but at an elevated height to reduce risk of contamination, and selling vegetables from trusted local producers who apply GAP on pesticide use).

Due to increased consumer demand for local safe vegetables, two national standards for local safe vegetables have been created: CAMGAP and CAMOrganic. To support this development, CHAIN-2 collaborated with the GDA to provide provincial level training to introduce CAMGAP standards to CHAIN lead farmers and provincial extension partners and piloting 19 CAMGAP farms to demonstrate potential uptake. It is expected that larger off-takers at national level (supplying leading supermarkets) and exporters will require CAMGAP in the future. CHAIN-2 has supported the development of the technical guidelines and the manual for CAMOrg. An increased demand for organic vegetables needs a better regulated and controlled supply chain through certification. At the moment many unjust claims are made with a diversity of descriptions on the product (natural, ecological etc). A Cambodian standard will reduce the cost of certification and enable cheaper group certification through the Participatory Group Guarantee System (PGS).

CHAIN recruited the marketing firm Melon Rouge Agency (MRA) to create a concept for a national-level local fruit and vegetable marketing campaign to motivate Cambodians to consume more local fruits and vegetables. A national Facebook campaign called "Planted by Khmer" was launched with over 12.000 followers which empowers consumers through a combination of education and motivation. CHAIN had planned to organise with MAFF, the *National Day of Khmer Vegetables and Fruits*, a nationwide movement that consumers, retailers, and farmers can join to show their support for Khmer vegetables and fruits. Due to COVID all the events related to the national day and at the supporter shops were cancelled and had to be postponed to CHAIN-3. The Planted by Khmer campaign pitchdeck is Annex K.

Market Study Results

The CHAIN team worked with national consultants to perform a market study of the supply of key vegetables in the CHAIN target areas. This study updated the first market study from CHAIN 1 and revealed many new insights about how the market has changed. The market study, mentioned earlier, is Annex D.

3.3 Outputs for Outcome three Enabling Environment

CAMOrganic guideline

CHAIN-2 has supported the promotion of local safe vegetables, and compliance with the national standards: CAMGAP and CAMOrganic in collaboration with MAFF and GDA. A training booklet was drafted, which will support the dissemination of organic practices with farmers and extension staff. Due to COVID various stakeholder meetings and TOT needed to be postponed. Finalisation of guidelines and training will be done in CHAIN-3.

Horticulture policy support

The development of the Horticulture policy continued in 2020, with CHAIN-2 closely involved in the consultations and providing strategic advice. The progress was delayed due to COVID. In the end 2 meetings of the working group with MAFF, HARVEST and 2 consultation meetings (1 in Siem Reap, 1 in Phnom Penh) could be organised. CHAIN contracted a sector study to support the policy development. (Annex L). CHAIN-2 also drafted Provincial Horticulture Strategies for each province. Policy and strategy development need to be continued in CHAIN-3.

Knowledge sharing activities

CHAIN has been working closely with its partners, private sector, and development organisations to promote horticulture sector development at national and sub-national levels. Practical demo-plots with private sector involvement, cluster group learning, support from provincial government staff and farmer-to-farmer extension have proven to be effective.

As a part of knowledge sharing strategies, the project has been developing success stories and case studies from the project interventions, as well as 5 draft videos which specifically delve into year-round production, Biological pest control, Smart Water, Development of local market access, and overall results. Farmer extension material has been developed including 21 crop guides,12 technical guides, and 5 training modules, and shared by EWSF with farmers in the project target areas. Private sector and government partners have learned from the CHAIN model and its documentation. In CHAIN-3 these knowledge products will be finalised and the CHAIN experience and lessons learned will be capitalised for knowledge sharing. During the COVID-19 outbreak, the project has collaborated with PDAFF, PDoWA, and its partners to share hygiene, sanitation, and nutrition knowledge to farmers through distribution of leaflets and organising nutrition & hygiene community dialogues.

Collaboration with other projects and development initiatives

To ensure the sustainability of project interventions, CHAIN has built close collaboration with other development organisations to foster further development of the sector:

HARVEST-II: supporting the development of the horticulture policy and standards for safe vegetables and fruits guidelines (CAMGAP), including national and provincial dialogues for vegetable production.

RED-IV project (GIZ): promoting good agricultural practices for vegetable production in Preah Vihear and Oddar Meanchey, and a workshop on Agriculture Waste Management.

SDP (SwissContact: linked to East West Seed to support the gardens of the students at the PTC's in the provinces

SUN Network: sharing lessons on nutrition interventions.

ASPIRE (MAFF) and AIMS (MEC) both IFAD funded, strong collaboration as provincial and national level promoting some of the interventions like Leadfarmers, greenhouses, market fairs, local market development, CAMGAP support.

QHC (NZ-Plant Food research) on vegetable safety & CAMGAP.

4. Finance and Management

4.1 Finance

The expenditure in the last year of CHAIN-2, 2020, was 96%. Due to COVID restrictions some of the regular activities like field visits, and field gatherings could not be performed for several months in 2020. This has led to an underspending especially at outcome 2, as PDAFF staff, company staff could not travel nor could do any co-investments. Also, some of the transfer ToT of CAMGAP and CAMORG activities and the field visit of the Project Advisory Committee/Ministry of Agriculture had to be postponed. These activities, but not its budget, were in agreement with SDC, transferred to CHAIN-3. The COVID measures budget was spent entirely.

Overall CHAIN-2 has achieved a 98% level of budget exhaustion with a balance of 75,404.25 CHF out of the total budget of 4,500,000 CHF. The cash balance which SNV is holding is 25,401 CHF, and it will be transferred back to SDC, after approval of the final report. The original budget was topped up with 100,000 CHF for COVID measures in 2020.

Table: CHAIN-2 Expenditure vs Budget (CHF)

		Overall budget	**Expenditure Dec17-Dec19**	**Expenditure Jan-Dec20**	**Total Expenditure**	**Balance (CHF)**	**Balance (%)**
Part 1	Services Headquarters [HQ]	54,210.90	7,123.40	25,087.50	52,210.90	2,000.00	4%
Part 2	Local Office of Contractor	52,471.66	32,832	19,238	52,069.32	402.34	1%
Part 3	Project Implementation Unit	2,358,908	1,573,772	729,177	2,302,948.86	55,958.89	2%
3a	*Long-term experts*	*1,679,676*	*1,154,157*	486,774	1,640,931.20	38,744.58	2%
3b	*Short-term experts*	*338,798*	*193,268*	145,264	338,531.46	66.05	0%
3c	*Local support*	*340,434*	*226,347*	97,139	323,486.21	16,948.26	5%
Part 4	Administrated project funds	2,034,410	1,137,474	879,893	2,017,366.98	17,043	1%
	Outcome 1	*1,066,227*	739,256	350,379	1,089,634.87	- 23,408.34	-2%
	Outcome 2	*615,594*	230,430	338,031	568,460.83	47,133.47	8%
	Outcome 3	*352,589*	167,789	191,482	359,271.27	- 6,682.12	-2%
		4,500,000	**2,771,202**	**1,653,394**	**4,424,596.05**	**75,404.25**	**2%**

See Annex M for the overall Financial Statement.

4.2 Human Resources

Long-term experts

All long-term positions has been in place since the start of the project. In January 2020 a new Value Chain and Market Advisor in Kratie/Stung Treng, Mr Socheat Ouk, started working. The Team Leader, Ms Marieke van Schie moved to another project in Africa for SNV and Caroline Blair was her interim replacement. In November the new project manager Mr Rik Overmars, arrived in Cambodia for his quarantine.

Table: The overview of CHAIN team

Position	Long-term experts
Team leader	Marieke van Schie (until 31 August 2020) Caroline Blair (1 September – 18 December 2020) Rik Overmars (27 November-31 December 2020)
Business and Market Development Advisor / Project Deputy Manager	Lim, Sokundarun
Senior Horticulture and VC advisor	Bun, Saborn
Value Chain and Market Advisor, (Preah Vihear / Oddar Meanchey)	Kaing, Chanlen (based in PVH)
Value Chain and Market Advisor (Kratie / Stung Treng)	Sieng, Kan (based in Kratie 2019) Ouk, Socheat (based in Kratie 2020)
Provincial Market Facilitator (Kratie)	Munirorth, Yous
Provincial Market Facilitator (Stung Treng)	Un, Raeun
Provincial Market Facilitator (Preah Vihear)	Yan, Udom
Provincial Market Facilitator (Oddar Meanchey)	Sokchea, Srey

Short term experts

Horticulture Expert	Mr Rik van Keulen (SNV)
Market Development Advisor	Mr. Kevin Robbins (Swisscontact)
National Development advisor	Ms. Choup Sao Cheavy (Swisscontact) Mr. Tray Bunthan (Swisscontact)
National water and irrigation advisor	Mr. Lim Naluch (SNV)

4.3 Audit & Administration

Audit

CHAIN-2 was audited in February 2021 by the firm PriceWaterhouseCoopers (PWC), and no major matters were observed. The audit statement is send separately.

Office, Vehicles and Equipment

All the assets of CHAIN-1 and 2 have been separately registered in the asset list and those assets will be handed over to CHAIN-3. The asset list is send separately.

5. Lessons Learnt

Many lessons of the CHAIN model have been learned over the years. These will all be captured more deeply and described in CHAIN-3's knowledge products. A few lessons we would like to highlight:

- Practical interventions to a market systems development approach work well with adaptive management. It is helpful to change course where needed based on feedback from the field, to drop what doesn't work in practice and adapt new things which could work, and test them out.
- Interventions should be simplified so they become workable.
- Some of the interventions are on-its-own not sustainable, i.e. there is no market demand and willingness to pay for them, nor is it a ready public function to be supplied by government. But they serve the project purpose of stimulating the market and crowding-in.

The most exciting interventions and some of their lessons in CHAIN:

- *Farmer segmentation and graduation.* A blanket approach doesn't work as farming households are very different in their responses to commercial opportunities. Farmers adapt their strategies and can graduate or down-grade depending on the risks, attitude, and productive assets they have.
- A *cluster approach* where market linkages are built, supported by government, can be quite successful, using a push and pull strategy. Push strategy on farmer production includes training on increasing productivity, intensifying production through farmer-to-farmer extension and demos, stimulating behaviour change, creating a critical mass for demand of inputs, and enforcing the link with private sector training and product services. Some of the input selling companies have increased their sales in these new markets for them, enormously (e.g., up to 1000%). A Pull strategy on increasing market demand for local vegetables, stimulates many suppliers to produce, and united in a cluster, creates a critical mass of suppliers to have enough volume to interest the buyers and bigger off-takers to construct a regular supply relationship.
- *Lead farmer incubator*. Farmer-to-farmer extension is an effective mechanism for technology uptake, market information and learning. Lead farmers who have capacity to facilitate this learning are an important element. The Lead Farmer Incubator supports these farmers with more business skills include the technical and market information and start providing services like selling inputs and buying vegetables from producers. The lead farmers who have completed the incubator program and started their businesses have increased knowledge, skills, business performance, increase their productive assets and social reputation and it is hoped that they will continue to run and scale up their business for supporting other horticulture farmers in remote areas.
- *Year-round production*. Local markets do get saturated and for many of the bigger buyers, consistency in volumes and quality is very important. Producing year-round needs technologies, like net-houses and irrigation, can boost farmers' income considerable. Co-investments in technology (PPP) can showcase and attract investments for bigger uptake. We have to see if technology suppliers will set up permanent sales channels and after-sales services in the areas.
- *Rural Business Accelerator*. Stimulating local SMEs as part of the market system is a very important part of creating lasting market relationships. Some SMEs and entrepreneurs really need business management support to grow. Our training has helped various SMEs to run their business better, be more customer focused. Some input SMEs even advise producers on what to grow depending on the seeds they have sold to other customers, thus leading to a potential oversupply in the market. Some SMEs with enough business have been too busy to show any interest in participating in such a training. And for most of the SMEs the willingness to pay for the training service is not there.

- *Smart Water Solutions*. (Drip) Irrigation is one of the most important investments farmers make in producing vegetables. But you need to extract the water from the source, bring it to the farm, and administer it to the crop in a cost-efficient way. Reducing water consumption, for instance, by using plastic and organic mulch is also very effective. The management of collective water resources beyond the farm will become more and more important to create true climate resilience. Pilots have demonstrated that there is a big interest but also a significant need for adequate financing solutions to pay for these investments.
- *Working with local partnerships.* CHAIN worked with many local SMEs, local NGOs, and provincial and district government. These were important to cement the clusters, establishing linkages and relationships. Working with all these partners is not always easy, but it helps to discover what their mandate is, what their capacities are and how to strengthen those. For the government we created an interest to learn about the market system development interventions, develop an inclusive commercial approach to horticultural development and to explore what the public functions are which need to be served in a market system, and thus taken up by the government. Collaborating with complementary partners such as SwissContact improves the results of an overall programme.
- *Stimulating market demand.* Using market stall and a social media campaign (Planted by Khmer) is part of a movement where demand for local safe vegetables are increasing. However how much safer are these local vegetables compared to imports? Anecdotical evidence of newspaper articles revealed some scandals in imported vegetables and its food safety. However, with the absence of a system for structural testing for pesticide residues on both imported and local vegetables, it is hard to know for sure. Also, an independent GAP certification and auditing system is still far away. For the moment we work on strengthening the CAMGAP pilots and hope that bigger buyer pressure will force Cambodian market actors to embrace GAP certification. For local markets the aspect of food safety is built on trust – we hope that this is justified in practice.

6. Annexes

a) ToC CHAIN-2
b) Farmers transferred to CHAIN-3
c) Impact Results Table
d) Vegetable Market Study
e) Market Actor Survey
f) Qualitative impact evaluation CHAIN-2
g) Lead Farmers assessment report
h) Smart Water Solutions report
i) RBA assessment report
j) Cluster Assessment report
k) Planted by Khmer Pitch deck
l) Horticulture Sector study
m) Signed Financial table