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Swiss Agency for Development  
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## Cambodia Horticulture Advancing Income and Nutrition Project



### End of Phase One Report- FINAL

31 May 2018

Implemented by:



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## List of Abbreviation

AGID:	Angkor Green Investment and Development
B:C:	Benefit to Cost Ratio
B2B:	Business to Business
BCA:	Bio Control Agent
BCC:	Behaviour Change Campaign
BIC:	Business Information Card
CBA:	Cost/Benefit Analysis
CEDAC:	Cambodian Centre for Study and Development in Agriculture
CF:	Commercial Farmer
CHAIN:	Cambodia Horticulture project Advancing Income and Nutrition
CHF:	Swiss Francs
CRDT:	Cambodian Rural Development Team
DAL:	Department of Administrative Affair and Legislation
DDS:	Dietary Diversity Score
EPR:	End of Phase Report
EWSF:	East-West Seed Foundation
FG:	Farmer Group
FGD:	Focus Group Discussion
FGS:	Farmer Group Strengthening
FSG:	Farmer Saving Group
GDA:	General Directorate of Agriculture
GE:	Gender
GIZ:	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
HF:	Homegarden Farming
HH:	Household
HLM:	Hoang Long Mekong
HQ:	Headquarter
iDE:	International Development Enterprises
IPM:	Integrated Pest Management
IRR:	Internal Rate of Return
KAFDOC:	Khmer Association for Development of Countryside
KAP:	Knowledge, Attitude and Practice Study
KBA:	Khmer Buddhist Association
KRT:	Kratie
LO:	Local Office
LoA:	Letter of Agreement
MAFF:	Ministry of Agriculture Forestry and Fisheries
MFI:	Micro-Finance Institute
MoU:	Memorandums of Understanding
MoWA:	Ministry of Women's Affairs
MPPP:	Market Production and Promotion Plan
MRM:	Monitoring and Result Measurement
MSP:	Multi Stakeholder Platform
NGO:	Non-Government Organization
NSDP:	National Strategic Development Plan
NTFP:	Non-Timber Forest Products
OMC:	Oddar Meanchey
PDAFF:	Provincial Department of Agriculture, Fisheries, and Forestry
PDoWA:	Provincial Department of Women's Affairs
PG:	Processing Group
PPP:	Public Private Partnership
PPP:	Public-Private Partnership
PS:	Private Sector
PVH:	Preah Vihear
RCEDO:	Rural Community and Environment Development Organization
RGC:	Royal Government of Cambodia
RUA:	Royal University of Agriculture
SCF:	Semi-Commercial Farmer
SDC:	Swiss Agency for Development Corporation
SME:	Small Medium Enterprise
SNV:	Netherlands Development Organization
STG:	Stung Treng
Square meter:	m <sup>2</sup>
WEE:	Women Economic Empowerment
WORLDVEG:	The World Vegetable Centre

## 1. Basic information

Country/region : Cambodia	Cambodian Horticulture Advancing Income and Nutrition (CHAIN)
No SAP : 7F-08731	
Domain SDC: A&FS	Sector / strategic domains (HA) according SAP:
Domain of intervention/component of Cooperation Strategy:	
Main objective of the project/programme: To increase the income and food security of smallholder farmers in four provinces of Cambodia, namely in Kratie, Stung Treng, Preah Vihear and Oddar Meanchey.	
Start of project: 1.12.2014	Scheduled duration: 8 years
Start of the current phase: 1.12.2014	End of the current phase: 30.11.2017
SDC budget in Swiss Francs for the current phase according to Credit Proposal: <b>4 Million</b> Accumulated SDC budget in Swiss Francs of previous phases: 0 Information on partners and/or other donors contribution (calculated in Swiss Francs): 0	
Implementing organisation(s) : SNV Netherlands Development Organisation (SNV) is the lead agency in a consortium with the Swiss Foundation for Technical Cooperation (Swisscontact)	
Main National Partners : Ministry of Agriculture Fisheries and Forestry, Ministry of Women's Affairs, Royal University of Agriculture	Main International Partners: World Vegetable Center (WorldVeg)
Sources of information for the EPR: Phase 1 Evaluation report & project reporting	
Written by (Name of Author(s) / Organisation): Marieke van Schie, SNV	
Responsible for the EPR (name of person): Mrs. Marieke van Schie, Team Leader CHAIN Mr. Hem Sovannarith, SDC Programme Manager	
Date of edition of the EPR: 31/5/2018	
<p>CHAIN focuses on developing horticulture value chains in Oddar Meanchey, Preah Vihear, Stung Treng and Kratie provinces, with a strong focus on womens' economic empowerment, delivering sustainable income growth and improved household food security and resilience. With a specific focus on the vegetables sector in the target provinces, CHAIN addresses market system constraints, leading to i) increased diversification of agriculture production among smallholder farmers; ii) increased incomes; iii) improved household food security; iv) improved livelihood resilience and enhanced production and control over resources.</p> <p>According to the original design, CHAIN aims to increase sustainable income for 15,000 homestead farmers; 3,000 commercial farmers; and 1,200 processors and improve household food security and nutrition for 72,000 people by 2022. During phase one, the project targeted 1,000 commercial farmers (50% women), 5,000 homestead farmers (95% women and 10% ethnic minorities), and 200 processors (80% women and 10% ethnic minorities).</p> <p>CHAIN's interventions during this phase were aligned with a. the Cambodian Government's strategic orientation and vision for the agriculture sector (National Strategic Development Plan (NSDP) 2014-2018) and b. SDC's Agriculture and Food Security Goal for Cambodia (according to the Mekong Region Cooperation Strategy 2013-2017), namely: "Women and men smallholder farmers (including female-headed households and ethnic minorities) improve their livelihood resilience."</p> <p>The first phase of implementation was conducted in close coordination with the Ministry of Agriculture Forestry and Fishery (MAFF), through the General Directorate of Agriculture (GDA) and the Provincial Departments of Agriculture Forestry and Fisheries (PDAFF). Additionally, the Ministry of Women's Affairs (MOWA) and Provincial Departments of Women's Affairs (PDOWA) were strategic project partners. At the provincial level, CHAIN partnered with six local NGO's for implementation of the activities at the farmer group level including the Rural Community and Environment Development Organization (RCEDO), Khmer Buddhist Association (KBA), Non-Timber Forest Products (NTFP), Khmer Association for Development of Countryside (KAFDOC), Cambodian Center for Study and Development in Agriculture (CEDAC) and Cambodian Rural Development Team (CRDT).</p>	

## 2. Summary of three years achievements

### **A. Description of intended and unintended effects (outcomes), if possible even on impact level:**

*a) What are the direct and indirect, positive and negative effects of the project/programme at both population and institutional/organizational level?*

Phase one of the project (CHAIN 1) made significant progress uplifting the horticulture sector in the four provinces. CHAIN 1 reached a large number of farmers (6,800) and created a high level of energy and capacity in the provinces among farmers, market actors and service providers.

Successful interventions addressing production, business and market development, small-scale processing, nutrition, and gender led to:

**Changes at farmer/household level** as farmers gain confidence and skills, they begin upgrading their production to the semi-commercial and commercial levels. This graduation is reflected in the high adoption rate of new technologies by farmers and processors, changes in production schemes, household incomes improving, farmers reporting changing eating habits, decreased workload for women and additional support from men. Women farmers gain confidence to try new activities in the sector to improve their incomes. Farmers are increasingly making demand-driven decisions, due to their better understanding of market requirements.

**Introduction of new companies to the provinces**, establishing new relationships, services and products. CHAIN introduced six large companies to the rural market as input suppliers and established linkages between traders, local input suppliers, and local producers. Business to Business (B2B) facilitation allowed for a need-based approach at farmer level and has strengthened demand-based production on the farmers' side, leading to more efficient production and higher incomes for farmers. CHAIN has established farmer groups and trader networks across the provinces, which help to increasingly adjust vegetable production to market demand. CHAIN is facilitating new market connections and businesses linkages to target areas with gender-sensitive services.

**Facilitation of numerous collaborations between public and private sector partners** at the provincial level, making the project a recognized model for private-public collaboration by the Government and other development initiatives in the provinces. The formalisation of the collaboration is evidenced by the CHAIN partnership agreement document. These new linkages have helped to improve the capacity of suppliers, service providers and traders to support farmers in adopting better production techniques, business development and market links, while their services have become more sensitive to gender issues. New levels of cooperation have been established between PDAFF and PDoWA and with businesses (through PPPs).

**Enhance partners' capacity, giving them increased confidence in the sector.** The capacity building of partners has brought a practical benefit to all. CHAIN trained and coached partner staff extensively in modern agricultural, business and market, gender, and food processing techniques. A large number of youth (recent graduates in the public and private sectors) were involved and they have reported they appreciate their new skills. By witnessing CHAIN's successful approach, partner NGOs have begun promoting a market approach. Public sector extension workers have applied their knowledge to other projects, specifically production and B2B facilitation.

The above has contributed to **systemic changes in the market system**, including new relationships, attitudes, behaviours, flows of information, products, and services that are apparent in the project area.

CHAIN has **increasingly received attention from a broad range of interest groups** including the public sector and development partners. The interest is evidenced by invitations to participate in policy discussions and forums and frequent visits to project sites by Government Delegations, in addition to the yearly project visit by a team of senior officials from MAFF and MoWA.

While it is recognized that **rapidly improving market conditions and growth** has benefitted the project, there is good evidence that the project has also played a part in enabling these changes. Infrastructure has improved recently, enabling better access to more distant markets. Another enabler for the project has been the Royal Government of Cambodia (RGC) endorsement of partnerships with the private sector that match the objectives of CHAIN.

### Key constraints:

**Farmer/households:** There have been visible constraints in certain instances around the willingness and ability of certain target farmers to adopt knowledge and utilize improved technologies. The adoption rates slowed during the dry and hot months from March - May, despite farmers' demonstrated interest in improving their production techniques. Groups are given the opportunity to 'graduate' from homestead to semi-commercial. Nevertheless, there is a group of farmers that will not transition and remains at the home garden level. A deeper investigation of the transition process between each of these stages reveals that there are fewer triggers for change for a homestead farmer (vs. a semi-commercial transitioning to commercial). Those groups that have not indicated their interest and willingness to transition were phased out at the end of phase 1.

The main points governing farmers' transition between the farmer types can be grouped as:

1. Making the choice if vegetable growing is the households main business or just a small income generating activity (one of many)
2. Debt management skills
3. Individual risk averseness
4. Presence or absence of labour and water
5. Technical skills and access to advice – linked with risk averseness
6. Trust – both between farmers and with the trader
7. Choice to be chemical free
8. Access to land close to home

There are non-growers among the home garden farmer groups with a lower adoption rate due to conditions such as flooding, limited access to water, their engagement with crops (rice) or selling of their labour, influences the willingness to invest time and resources in a homestead garden.

**Women in horticulture:** Women specific constraints to progress in horticulture production and marketing relate to their overall heavy workload and women's traditional roles, the distribution of tasks and responsibilities between men and women at household level, which may lead to tensions if the husband's buy-in for change is not fostered. Women often experience limitations of time and restrictions on movement due to gender norms and security issues. These factors can challenge their participation in activities outside the household. For example, services delivered by private and public sector partners may not reach women and often fail to consider their specific needs and constraints.

**Market level:** Cambodia imports about 40 percent of its fruits and vegetables at a cost of around \$200 million a year<sup>1</sup>. This includes many vegetables that can be produced domestically in an efficient manner. It is a challenge to compete with the cheap, attractive vegetables coming across porous borders (which are often cultivated using excessive chemicals). The supply chains for imported vegetables is very efficient (one phone call leads to delivery next day).

A similar challenge exists for the market development of quality inputs/technologies. There is an influx of inputs that come across Cambodia's borders that disturb the market and have a negative effect; e.g. harmful fertilizers and low-quality options in technologies such as some of the cheaper drip irrigation systems.

**Institutional level:** PDAFF prioritizes some projects and initiatives over others, especially government-led projects and those with significant resources. There is a high turnover of well trained staff to other projects, leading to an ongoing and high investment in coaching and repeat trainings to partner staff for CHAIN.

**Private sector market entry:** The CHAIN provinces are low priority provinces for market development of private sector, due to their low populations and lack of infrastructure. Companies were selective in which of the four provinces they were willing to work. CHAIN supported the companies overcoming initial risks to enter these comparatively remote and less densely populated markets.

*b) What is the degree of achievement of planned objectives of the project?*

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<sup>1</sup> Dr. Chan Phaloeun, Deputy Director General, General Directorate of Agriculture, Cambodia

The project reached 100% of the target beneficiaries, with a higher number of semi-commercial and commercial farmers, and slightly lower number of processors.

As the results show, the majority of beneficiaries appreciate the capacity development and increased access to value chain services CHAIN has provided, as well as the nutrition/income benefits that follow. Though not all targets have been fully reached, the trends demonstrate an increasing line in changing behaviours, which result in changed impact at the household level.

A summary of key illustrative impact indicators is shown below:

	Target	Baseline	Executed
Number of Home-garden/ Semi-commercial farmers, and processors	6200		6800
Increased income – Home gardeners (USD/yr)	100	155	18
Increased income – Semi-commercial farmers (USD/yr)	400	257	290
Increased income – Small scale processors (USD/yr)	100	80	100
Number of farmer groups strengthened and receiving market and business training	273		313
Number of households reached with nutrition training	6200		8583
Satisfaction with public and private service providers	0		78%

The overall outcomes and impacts of the current phase include:

- **Income:** The overall income targets for Homegarden farmers (HF) and Semi-Commercial farmer (SCF) and Commercial farmers (CF) have not yet been achieved. The household survey indicates the home garden farmers have a considerably lower income than the baseline, mainly due to a difference in the categorising method<sup>2</sup>. The average net income generated by semi-commercial and commercial farmers (257 USD total/ 200 USD net) is slightly higher than the baseline (290 USD total/ 204 net). The levels of income vary: 54% of the semi commercial farmers report a gross income higher than USD 100, whereas 47% of the commercial farmer earned a gross income above USD 500.
- **Home garden and Nutrition:** The Knowledge Attitude and Practice (KAP) study results present significantly enhanced home gardeners' adoption of homegarden farmer practices including increased vegetable yield, crop diversity, income (>USD100), vegetable intake frequency and nutrition knowledge; improved attitude and, empowered women (evidenced by greater participation in decision making on crop and food choices). There was no change in the household dietary diversity score with 10 food groups, even though the different studies show significant increases in vegetable production, crop diversity in garden and intake frequency.
- **Resilience, yields and technology:** 2,418 farmers (59% SCF and CF) reported increased yields, which is higher than the target (1000 farmers). Farmers have more knowledge about technologies, and are able to use new technology proficiently (target 60%) HF: 48%, SCF: 48% and CF: 63%.
- **Small scale-processing:** the processors in the 10 processing groups have improved their practices and increased their income reaching the target increase 100USD; however, the target of 200 processors was not achieved.
- **Farmer groups' collective action, business planning and market connections:** Studies demonstrate farmers are more willing to collaborate than they were three years ago and have become more dynamic in business planning and are establishing new market connections. 50% of the SCF and CF have traders linked to their groups, know more traders and demonstrated a better understanding of traders' demands. 49% of SCF and CF farmers prepared production plans based on the market information provided by the project.
- **Increased access to quality gender-responsive services:** There are significant positive changes with market actors facilitated by the introduction of six new companies to the CHAIN

<sup>2</sup> HH interviewed claimed to be HF, while the HF in the baseline (and other surveys) are categorised according to the type of group

provinces and through public private partnership arrangements. Additionally, 16 traders and 22 input dealers report an increase in their business activities due to linkages facilitated by CHAIN. Overall, positive change with an increase in sales for all private sector actors was realized; however, there is still a seasonal fluctuation affecting traders and input dealers.

- **Enabling Environment:** CHAIN contributed to the process of Bio Control Agent (BCA) registration being approved. CHAIN contributed to the implementation of the extension policy, by providing PPP experiences for upscaling. CHAIN played an active role in sharing knowledge about nutrition and behaviour change strategies in national platforms.

*c) An approximate analysis of costs/benefits of achieved outcomes*

As noted above, the impact of CHAIN 1 has been substantial, ranging from widespread farmer outreach to successful private sector engagement to capacity building of key stakeholders in the system. Such benefits are difficult to factor into a project's cost/benefit analysis (CBA). To simplify a CHAIN 1 CBA, it is necessary to look at the quantifiable impact of farmer income increases. Included below is a benefit to cost ratio (B:C), where the benefit is income increase for farmer households and the cost is project costs.<sup>3</sup>

The B:C ratio has been calculated in the following manner. CHAIN 1 worked with three categories of farmers: home garden, semi-commercial, and commercial. The average income increase<sup>4</sup> for each farmer category has been multiplied by the total number of farmers impacted by CHAIN 1. The number of farmers includes direct contact (farmers who participated in farmer groups) and indirect contact (farmers who were not in CHAIN 1 farmer groups, but who "copied" the behavior of CHAIN 1 farmers).<sup>5</sup>

In CHAIN 1, the total income increases for all three farmer categories (USD 3.2m) divided by the project costs (USD 3.6M) results in a **B:C ratio of 75% (for every dollar spent by the project, the farmer income increased .75 dollar)**.

To put this ratio into context, as a market facilitation project, CHAIN 1 has had to invest a great deal in broader systems change. This requires heavy upfront investments. Over time, the benefits of these systems change will result in farmer incomes rising at a greater rate. This is often described as **the s-curve effect in systems-change** and scaling literature. It is therefore instructive to look forward and project the B:C ratio that would result after CHAIN 2-3 are finished, assuming increases in farmer outreach and incomes.

Looking forward to the end of CHAIN 3, it is estimated that total income increases for all three farmer categories will be USD 18.8M and total project costs will USD 8M. This produces a **B:C ratio of 235%** (for every dollar spent by the project, farmer income will increase 2.35 dollars). Beyond this, other system impact is also projected: increased income for rural vegetable traders and input sellers, increased technical assistance for farmers from both private companies and public sector representatives, improved pro-farmer policy environment, and so on (see below for additional benefits beyond farmer income).

**B. Transversal themes:**

*Gender: What are the effects of the project/programme with regard to the reduction of inequalities between men and women? Have the women benefited at least equally from the project/programme in comparison to the men? What are the effects of the project/ programme with regard to the integration of the transversal theme?*

Vegetable growing in Cambodia is primarily performed by women. Hence, women are the main target for CHAIN. **The project reached mainly women (72%) and made deliberate efforts to reach ethnic minorities (10% of total outreach)**. CHAIN 1 integrated Gender (GE) and Women

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<sup>3</sup> This analysis is done in USD as this is the currency of measured benefit or farmer household income increase.

<sup>4</sup> Endline income increases are relatively low compared with baseline due to different categorising methodology

<sup>5</sup> The number of indirect contacts is estimated at 20% of direct contacts based on research of the independent end-line study team.

Economic Empowerment (WEE) engaging with the private and public sector, building their capacity in understanding the issues women face and their ability to address them.

Combined with the agricultural, business/marketing training, and nutrition, integrating gender in training allows women to increasingly see their important place in the value chain. They are more able to transform their land from subsistence to profit, and more confident to see their vegetable growing and processing businesses supporting their families. Likewise, the nutrition training has shifted their understanding about the food they prepare for their families.

To prevent more work falling on the women, **more male-inclusive activities** were introduced during 2017, to attempt to even out household workloads and responsibilities, and increase the adoption and sustainability of the new capacity development.

Gender training has also shown the private sector better ways to engage with women - their major client base for horticultural inputs. Regular client's satisfaction surveys facilitated by CHAIN have been an efficient tool in monitoring **gender responsive services**.

The increased involvement of MoWA and PDoWA is also a success of CHAIN, as they are learning new ways to plan their programs, multi-stakeholder and PPP collaborations.

#### **Gender/WEE indicators:**

- **53% of women reported to have more free time** than before. 50% reported receiving support from their husbands, (client satisfaction survey);
- More than **86% of men declared their support to reduce their wife's labour** and joined hands in field activities, and some house work (client satisfaction survey)
- **CHAIN partners feel more confident** in providing services that specifically address female farmers' needs (partner survey);
- 81% of households and 79% of female farmers reported that **responsibilities in their households were fairly distributed**. 68% reported a change in workload of which 61% indicated an increase of workload at household level (HH survey).

### 3. Outputs and performance, partners and context

- *Summary of the **main outputs**: what are the main tangible products (goods, services) of the project? What is the **outreach** of the project (e.g. population groups covered, area covered, institutional levels covered)?*

CHAIN successfully established market links along the horticulture value chain, reaching:

- **316 farmer groups**, approximately **6,800 farmers and processors (72% women & 10% ethnic minorities)**. 3,500 Home-garden farmers, 3,300 Commercial farmers, 1,200 Semi-commercial farmers and 800 Small scale processors

The main outputs of this phase in summary;

#### **At farm/household level;**

- **Households (majority women) more knowledgeable about farming-as-a-business**, and how to interact better with the market. 61% of the HG Farmers adopted new practices and increased the number of crops they cultivated, 50% graduated to semi-commercial farming
- **More skilled farmers** with better confidence to handle their own problems; 63% of CF increased yields, 71% is willing to work collectively on production or sales in their group. Sales increased by 59% for semi commercial and commercial farmers
- Community nutrition dialogues focused on **including men in household decision making** around nutrition. Additionally nutrition trainings provided to 8,583 HH.
- **Year round production of safe vegetables** by promoting integrated pest management (IPM) technologies through IPM trial plots and seed variety trails in collaboration with PDAFF and private sector partners. Field days for farmers, and linked to the local input retailers. Introduction of plastic greenhouses in 2017.

- CHAIN successfully introduced **grafting technology** in Cambodia through seed multiplication, and trials on grafting eggplant and tomato
- CHAIN successfully contributed to the process of **registration of Bio Control Agent (BCA) products** at the national level. This was achieved through the participation of project partners in BCA meetings including GIZ and MAFF (DAL).
- 100 Processors (eight male) received **extensive fruit and vegetable processing and enterprise development training** while 1.122 farmers (107 male) were trained in simple fruit and vegetable processing techniques.
- **Households more knowledgeable about nutrition** and incorporating vegetables in their family's diets. Around 90% of the households changed eating habits due to having more vegetables available and better nutrition awareness.
- **Access to water campaign** established 99 boreholes and ponds for individual farmers under cost sharing arrangement in Oddar Meanchey and Preah Vihear

#### **At the institutional and market level;**

- **Partner staff (including PDAFF and PDOWA) were trained on Business to Business (B2B) facilitation** including facilitation skills, negotiation, business planning and deal making. The B2B facilitators assisted semi-commercial groups and commercial farmer groups, with establishing connections with other market actors independently. The B2B facilitation has become increasingly important for the project in developing a sustainable market system for the vegetable sector in the four provinces. B2B has been endorsed by MAFF as one of the services delivered.
- **Six businesses introduced into the target area** through public private partnerships – mainly selling agricultural inputs, and providing technical support to CHAIN farmers. The new companies made new technologies available and accessible for farmers in the CHAIN provinces.
- Greater vegetable production, which is helping develop the value chains, particularly traders and input sellers. CHAIN built **farmer groups and traders' networks** across the four provinces; increased trade channels for majority of the farmers; and improved market information provided by traders for production plans. Traders' capacity has increased, including the ability to learn from and trade with each other.
- CHAIN has facilitated close **collaboration between public and private sector partners**, and improved their capacity to provide effective and gender-responsive services to farmers. PDAFF has encouraged partnerships with businesses, to augment their skills, and provide more comprehensive solutions to farmers.
- The project has invested considerably in building capacities of partners to deliver services to project beneficiaries including **energized youth** who have received training from CHAIN (as employees in public and private sectors) and NGOs. PDoWA is able to better advise women-run enterprises about business and marketing skills. All partners (PDAFF, PDOWA, NGO and Private sector) have been trained in Gender responsive service delivery.
- *Information on the **efficiency** of the project based on an approximate analysis of the relation inputs/outputs and budget/expenditures with explanatory statement in case of significant deviation from the budget*

As previously discussed, the four target provinces are remote and had very limited vegetable sector activities, relationships and infrastructure at the beginning of the project. Due to these factors, development programs have tended to focus on subsistence and emergency activities, and getting quality staff to work in these areas has been difficult. Establishing a project in this context required a significant initial investment of resources. Additionally, involving eight government departments, plus private and NGO entities, also required a considerable investment of time.

**The return on project investments has been mixed.** The home garden farming approach under CHAIN 1 included a high investment in nutrition behaviour change interventions. In addition, considerable effort and resources were applied toward small-scale processing pilots. These two interventions have been successful; however, the return on investment is not included in the cost

benefit analysis due to the fact the income figures are derived solely on income from selling vegetables.

Overall, the budget has been well disbursed, reaching the target number of beneficiaries. The accumulated value generated at the household level is 3.2 million, which has been generated through the sales of vegetables, with an investment of 3.5 USD million.

Local and national private sector partners have reported increased sales volumes; however, it has not been possible to include the increase of their returns, as the project has not been privy to that data.

- *Summary of **the contributions** of various partners and specific contribution of SDC*

CHAIN engagement with implementing partners and the private sector has been on a partnership model and highly effective resulting in collective action towards the shared objective of an increased horticulture sector in the four provinces. In all partnership agreements, both parties contributed to the interventions. NGO partners have contributed USD 326,599, while private sector contributed USD 116,673.

SNV contributed with the design of and materials for the nutrition behaviour change campaign "Super Mom" for approximately USD 58,000.

SDC has played a significant role in supporting project implementation. Through close coordination, the project has received strong support addressing challenges as they arise. SDC has been closely engaged, attending important events, including facilitating national level discussions.

- *Information on **transformations of context** if these have been significant for the evolution of the project (implementation and results).*

Over the life of the project, infrastructure relevant to market development has improved and is forecast to continue improving. Roads throughout the target area have improved markedly. Electricity availability also continues to grow. Rapidly decreasing poverty levels, mainly through better opportunities for off-farm income, also improve the business confidence.

The other transformation is with the government entities. The Royal Government of Cambodia (RGC) decentralisation process is gradually leading to more responsibility being taken by the provincial departments. In addition, the new MAFF extension policy encourages a more pluralistic, and less top-down, approach to provision of service to farmers.

At the market level there is an increased interest by consumers for safer vegetables and they have a preference for locally produced produce. Supporting the increased attention for safe food: CAMGAP standards have been adopted at national level and this will bring opportunities to pilot the rolling out at local level.

## 4. Lessons

- *Description of relevant aspects that have contributed to success/failure of the project.*

### **Main success factors of CHAIN 1:**

A. Providing well-researched, practical, needs-based training programs.

Beneficiaries have commented that CHAIN trainings are more effective than previous experiences with other programs. This is due to the fact that trainings are tailored to meet stakeholders' needs and solve the particular issues that would otherwise prevent them from progressing. Particularly useful has been the hands-on modern horticultural techniques (including on-farm trials) and the farming-as-a-business and marketing trainings.

B. Facilitative approach to value chain solutions

Project interventions facilitate market actors' provision of solutions to market system constraints. The project staff are employed to ensure the initial linkages are maintained until all parties can see the benefit and continue using their own resources or decide to discontinue. Project staff ensure the initial linkages are created and maintained until such a time all parties can see the benefit and continue using their own resources to progress or to discontinue. The market linkages are made between new and existing value chain actors through B2B facilitation. The new businesses are

introduced into the new project areas with minimal assistance. Subsidies are kept to a minimum, and only meant to provide an initial push. Subsidies are kept to a minimum and only meant to provide the initial push. The public sector is encouraged to exploit new service provision partnerships with the private sector for other sectors.

#### C. Engaging with the Private sector

New private sector companies were introduced into the target areas on a public-private partnership basis. The new market connections and businesses has resulted in improved gender-sensitive services and access to new technologies.

#### D. Flexible project management and learning

The project applied mechanisms to monitor progress and results to support flexible project management and decision-making informed by field level observation. Regular monitoring and result measurement (MRM) meetings were provided by the project team, during which evidence-based reflections on project progress (as measured against results) occurred. This informed and supported adjustments in the implementation to address changing circumstances at the field level, applying a collaborative learning and adaptive approach. The internal midterm review also played a crucial role in adjusting intervention strategies.

#### E. Coordination and linkages at national level

Concerted efforts were made to create linkages with other initiatives and partnerships at the national-level. This led to collective actions with other development partners and the RGC, including endorsing BCA registration and the joint organisation of a national vegetable forum. Furthermore, this collaborative approach led to GIZ and IDE's contribution and participation in CHAIN activities in the provinces.

### **Key learnings from CHAIN 1 include;**

- the need to continue capacity development around year-round production and market dynamics;
- a further focus of interventions on approaches that optimize efficiency by emphasising the graduation process towards semi-commercial/commercial production and market development, while mainstreaming nutrition and small scale processing;
- The importance of building on the synergies with and between different stakeholders and developing partnerships.

Other conclusions and lessons learned from this phase are that:

- a. There is sufficient absorption capacity of the regional markets for local produce, provided farmers are able to provide quality produce in a timely manner for an acceptable price;
- b. Attention to production will remain critical to ensure farmers can meet market requirements, considering the generally limited knowledge on improved production practices at the farm-level.
- c. Strengthening the knowledge and skills of CHAIN partners and other service providers is a motivating factor are a motivating factor;
- d. The positive collaboration between public and private sector through Public Private Partnerships (PPP) has brought a new level of cooperation resulting in better services to farmers, and improved business models;
- e. Access to water and the use of appropriate water storage and distribution technologies are critical to commercial vegetable farming as these technologies facilitate production at times of high demand and higher price;
- f. Business-to-Business (B2B) facilitation has proved to be a promising tool in market system development, stimulating collective action among farmers. However, B2B facilitation requires significant technical support at the production-level, and more market-oriented issue-based approaches;
- g. Small-scale vegetable processing at an artisanal-level has proven to have limited impact potential. There is limited interest from processors to scale up the processing activity to a Small Medium Enterprise (SME) level and the required SME support is beyond the scope of CHAIN resources/focus;
- h. The facilitation of gender responsive services remain critical due to the large proportion of women producers. However, to improve adoption and sustainability of project interventions, an increased focus on male-inclusive activities is required.

The approach in CHAIN 2 builds on the achievements, experiences and lessons from Phase I, which includes an increased focus on market development and semi-commercial and commercial farming.

- *Description of **main difficulties** faced during the phase and efforts made to overcome them. This may include PCM-related challenges.*

#### A. The project area

The remoteness of the project area has been challenging - it is far from the head office in Phnom Penh, and distances are significant both within the project provinces and between provinces (it is at least eight hours drive from Kratie to Oddar Meanchey). Additionally, within the provinces, the population is low and spread out, which stretches the economics of the provision of services, and lowers investment attractiveness. The geography of the project areas, distances to major markets, and comparatively-low capacities hampers competitiveness.

#### B. The diversity of activities within the project

The diversity and number of project activities and managing numerous and diverse partners leads to work overload of project staff. It has been relatively difficult to attract and retain high-level, experienced staff.

#### C. Partner capacities

Partnering with PDAFFs and PDoWA entails competing with other development activities and with different expectations of incentives. The partners (particularly PDAFF) continue to have a high staff turnover in CHAIN, as frequently the most capable staff is moved to other projects. CHAIN will continue to encourage partners to allocate staff to the project with the requisite capacities.

The partnership with local NGOs has improved project outreach and local ownership; however, most still have more traditional operations and limited market facilitation capacity.

#### D. Reliable data collection for accountability purposes

There has been turnover amongst farmer groups and this has created challenges in maintaining records. Partners were requested to update the farmer group household (member) lists. The updated HH lists revealed significant changes in the composition of the groups, with about 30% of the farmers having left and been replaced by new ones. The use of English and Khmer in the lists and the different formats being used led to a complicated exercise, consuming significantly more time of all involved than was anticipated.

#### E. Baseline and endline

Comparison between the baseline and endline proved challenging, due to differences in classification methodology. The baseline average income figures were compiled with farmers categorised into two group categories - either home garden or commercial group.

In the endline household (HH) survey, the classification (homegarden, semi-commercial or Commercial farmer) of farmers was made by the interviewee (a self-categorization), resulting in a low percentage (27%) selecting themselves as home garden farmers.

In CHAIN 2 the income analysis will follow the individual farmer profile/criteria throughout to ensure valid comparison.

## 5. Exit Strategy

- *Where is the project with regard to an **exit strategy**?*

CHAIN 1 used a **facilitative approach**. In the target provinces, the project focused on increasing the capacity of actors within the vegetable sector, facilitating new relationships between existing actors, and working with stakeholders inside and outside of the target areas to introduce new products and services into the region. A key feature of this facilitation was grounding intervention design in an understanding of the incentives that motivate actors within the sector. The combination of capacity, motivation, and access to needed products and services – framed within an improving

enabling environment – increases the likelihood that the results of CHAIN 1 will persist, evolve, and expand after the project’s conclusion.

CHAIN 1 worked with **vegetable farmers** not only to sustainably increase their production, but also to link them to key products and services in the market. Homegarden farmers have benefited from improved family nutrition and more affordable access to safe vegetables. Semi-commercial and commercial farmers have new relationships with private-sector (provision of inputs and technical assistance), with the public-sector (e.g. extension and production support), and with traders (who provide key information on market demand). As these commercial farmers continue to advance, they will begin to have access to national-level buyers who seek contract farming arrangements to replace their current import practices.

CHAIN 1 collaborated with the **private sector** to realize business opportunities existing in the target provinces. Through co-investments, the private sector was incentivized to launch business strategies that can continue to develop independent of CHAIN involvement. As a result of CHAIN interventions, these companies now have new relationships with local input sellers, vegetable traders, farmer groups, and local public-sector representatives. These companies now also appreciate the market potential of the target provinces through first-hand experience.

CHAIN 1 collaborated with **local NGOs** and **public-sector extension workers** on a combination of agronomic know-how, business acumen, and relationships with private sector representatives. Many of the staff from these partner organizations were young, freshly graduated from agricultural universities. Within the local context, these staff would have typically operated on a supply-drive model, delivering training and advice to farmers based on institutional preferences and/or historical cropping patterns. However, with support from CHAIN 1, these staff have seen the value of a demand-driven approach, treating farmers as business people who need strategies built on market demand and technical assistance attuned to an evolving market. At a higher-level, leaders of the public sector have witnessed a proof of concept and now understand the mutual benefit that comes from collaboration with the private sector and developing the business capacity of farmers.

In summary, through the application of a market facilitation approach, CHAIN 1 has worked with farmers, private sector companies, local NGOs, and the public sector in a manner that has fostered stakeholders’ capacity and motivation to continue their work beyond the project’s conclusion.

- *Where is the project with regard to **replicability and scaling up**?*

Within Cambodia, the project is easily replicable in other provinces, but would require a market survey to determine necessary adjustments based on the level of development of the market, the capacity of market actors, existing relationships with the market, etc. In fact, project staff have received numerous requests from current and upcoming agriculture-related initiatives to learn more about the CHAIN 1 approach and how it could apply to other provinces and/or other sectors. It is worth noting that the CHAIN 1 team evolved the model over the three years of the project: Year three looked quite different than Year one. An openness to intentional learning and adaptive management would be required in replicating project interventions elsewhere.

If the project were replicated in other provinces and sectors in Cambodia, there would likely be important synergies as private and public-sector partners benefitted from economies of scale and increased collaboration based on successful collaborations under CHAIN 1.

Outside of Cambodia, the project is also replicable, particularly the combination of farmer production support, B2B facilitation, and capacity building for market stakeholders. But clearly context would necessitate a technical assessment and strategy adjustment - it would be important to employ a team of staff with the ability to critically analyse the context and make strategic pivots as needed to better accommodate the local system (differences in supply chains, local practices, available products and services, culture, policy, and so on).

With CHAIN 2, the project team will continue to scale-up the most successful features of CHAIN 1. The project will work with a larger number of farmers, including more in remote areas. It will work with more vegetable traders, input suppliers, and national input companies. CHAIN 2 plans to facilitate the formation of clusters and linking larger numbers of farmers with companies who are

interested in contract farming. CHAIN 2 will mainstream its gender and nutrition work so that these transversal themes are addressed with a wider population.

Independent of CHAIN 2, other indicators of scale-up exist. As stated above, other programs are interested in replicating elements of the CHAIN 1 model, which will scale project benefits into other provinces. Some CHAIN 1 partners have already started to use project materials such as training materials in other projects where they participate. Some of the private sector partners have started to scale business models tested in CHAIN 1 out to other provinces. One company, for example, that used to rely on demonstration plots managed by company staff have seen great benefit from a new model – developing farmer agents who manage demonstration plots and market products to other farmers – and have exported this model to non-CHAIN provinces. Within the enabling environment, the team has seen public sector representatives advocating that lessons learned from CHAIN 1 be applied in other areas of the country or in other sectors. These indicators – along with the planned work of CHAIN 2 – suggest that the benefits of CHAIN 1 will continue to be scaled-up over time.

## 6. Financial report (summary)

In overall, the expenses for CHAIN's three year implementation were 99% of total budget approved. Per budget fragment there are small variations of one or two percent compared with the planned approved budget<sup>6</sup>. The total activity costs (part four) amounted for 44% of the total budget.

The project balance has been transferred back to SDC in March 2018.

		<b>Total Budget (Revised)</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>	<b>Total (CHF)</b>	<b>Balance (CHF)</b>	<b>(%)</b>
<b>Part 1</b>	Services [HQ]	-	-	-	-	-	-	
<b>Part 2</b>	Local Office of Contractor	77,432	19,070	23,626	33,576	76,272	1,160	1%
<b>Part 3</b>	Project Implementation Unit	1,941,869	554,926	673,835	691,967	1,920,728	21,141	1%
<b>Part 3a</b>	Long-term experts	1,301,976	383,565	436,125	465,954	1,285,644	16,332	1%
<b>Part 3b</b>	Short-term experts	323,833	80,259	130,169	106,958	317,387	6,446	2%
<b>Part 3c</b>	Local support	316,060	91,101	107,541	119,055	317,697	-1,637	-1%
<b>Part 4</b>	Administrated project funds	1,560,698	125,518	604,733	819,175	1,549,427	11,271	1%
		<b>3,579,999</b>	<b>699,514</b>	<b>1,302,194</b>	<b>1,544,718</b>	<b>3,546,426</b>	<b>33,573</b>	<b>1%</b>

<sup>6</sup> The approved budget for 2017 included a reallocation between some of the budget lines.

## Annex 1 Illustrative examples

### From home consumption to commercial farming

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*"There are two main factors: technical skill improvement and market access that have changed my home growing for food to commercial farming"*

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Ms. Thun Voeun and her husband Mr. Chea Ly live in Srah Chhouk village, Trapeang Prey commune, Anlong Veng district, Oddar Meanchey province.

Their farm size is around 2,400 m<sup>2</sup>, before they would grow vegetables on about 200 square meters (m<sup>2</sup>) for household consumption and cassava production on the remaining land.



Photo 1: Ms. Voeun's and Mr. Ly's farm

In 2015 Ms. Voeun joined the CHAIN home garden group.

She received training in production techniques by PDAFF and Haolong Mekong (HLM) Company. She was linked with input dealers and traders in her area. Since then, there is a significant change in their farm management, applying new techniques, including; land preparation, raising beds, soil sterilization, seed selection, seedling production, how to apply fertilizers (focus on bio fertilizers/compost solid and liquid), trellising, irrigation system, crop diversification and crop rotation. She has extended the vegetable farm to 1000 m<sup>2</sup> and they now grows a variety of vegetables. For the last two cycles she harvested enough vegetables for household consumption and to sell to villagers and market. She reported to have earned about 3 million riels or USD 750 from selling vegetables during two crop cycles.

She Has graduated to semi commercial farmer. Currently she grows more than ten crops in her farm and expects to generate more income from her commercial vegetable production.

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### Seeing is believing

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*"I can now grow eggplant and tomato in my area without fear of pest."*

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Ms. Lay Chantey is a farmer in Hangkhosoun village, Sangkat Sameky, Stung Treng provincial town.

Her farm is 1500 m<sup>2</sup> (30m X 50m), where she used to grow long bean, bitter gourd, cucumber, wax gourd, cauliflower, several other leafy vegetables She rarely grew eggplant and tomato in her garden because it of the high risk of pest and diseases.



Photo 2 Ms. Lay Chantey at her farm

Since 2016, she received technical training in vegetable production, including bed raising, water application and management, pest and disease management, using fertilizer, crop pruning and post-harvesting technique, by CHAIN's partners, such as PDAFF, East West Seed Foundation (EWSF), and Angkor Green. What mostly amazed her was the introduction of eggplant-tomato grafting technique, facilitated by World Vegetable Centre (WorldVeg). She saw with her own eyes that tomato can grow at her farm, with a very fruitful yield.

She is very excited with what she has learned through the CHAIN project. She is connected with a local network of traders and input supplier. From the last two cycles in 2017, she generate an income of USD 3,425 from vegetables (cucumbers, bitter gourd, mint/herb, wax gourd, eggplant and tomato) on 1500 m<sup>2</sup>.

She is happy to share what she learnt to other farmers who are interested in vegetable production.

## Safe production

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*"Even it is new for me but I prefer to try with the modern agricultural techniques."*

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Ms. Sam Deat is a farmer in Sethapor village, Pal Hal commune, Preah Vihear provincial town, Preah Vihear province. She used to grow vegetables in conventional way and sell them.

In 2015, she became a member of a CHAIN commercial farmer group. She started to grow vegetables year round in order to supply local traders. She has been trained in seedling production, raising bed, the use of plastic mulch, drip irrigation, trellising net, fertilizer program, pest management, and biological control agent (BCA) by PDAFF together with private sector companies, including Angkor Green, HLM and Sokha Pol (changed to Rohat now).



Photo 3: Ms. Sam Deat

Currently, she applies the new technical knowledge to growing bitter melon, eggplant, round eggplant, cucumber, choy som, curly mustard, Chinese kale, bokchoy and/or lettuce. She can generate a monthly household income of approximately USD 400 from vegetable production.

*"I am very happy with the new technologies, they save time, reduce the use of chemical, my family has better health, scale up my productivity, and traders regularly come to buy my product",* said Ms. Sam Deat.

Now she became a lead farmer in her area and she hosts visits at her farm to share the practical experiences with others.

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## Vegetable production is my new hope

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*"Vegetables have improved my living standards"*

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Mr. Chav Yom is a disabled farmer in Orun village, Thlat commune, Anlong Veng district, Oddar Meanchey province.

He joining a CHAIN group in mid-2016. At that time he piloted growing vegetables on a farm of 100 m<sup>2</sup>. Within a few months he increased plots of land up to 300 m<sup>2</sup> to grow vegetables. He kept extending his production size to 4000 m<sup>2</sup> now.

In 2017, with support from CHAIN, he invested in a plastic hoop house allowing him to grow five crop-cycles per year. He grows leafy vegetables such as bok choy, choy sum, and curly cabbage. During the last 4 cycles of his vegetable production, he earned USD 1,300. The fifth cycle is in process of harvesting and he expects a high profit due to the good market price.



Photo 4: Mr. Yom at his vegetable farm

*"I am very proud to of the plastic hoop house that allows me to produce safe vegetables, selling at a high price, and with a good reputation. Other people admire my vegetable farm. Seeing my success, has triggered six other neighbors wanting to invest in plastic house as well. I am discussing with my family to invest one more plastic hoop house",* said Mr. Chav Yom.

## Home garden increase income for school fees

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*"Thanks to her garden, she has been able to send the children to school"*

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Mrs. Roth Kimher, is a farmer in Talos, a small village in the Cambodian province Kratie. Together with her husband, her 12-year-old nephew and 6-year-old niece, she is cultivating a small home garden.

Since she was connected to CHAIN, a lot has changed. Last year, she was unable to grow any vegetables year round because of rain and flooding. Since then, she has learned about new crops, cultivation techniques, and seed quality. By applying mulching, raised beds, raising seedlings and using plastic nets to protect her crops, she increased her yields tremendously. Growing cucumber, long bean, and leafy vegetables now yields enough to sell the surplus in the village, while having enough for home consumption as well. By selling her produce, she has added 500,000-1,000,000 Riels (USD 125-250) to her monthly income.

Mrs. Kimher considers working in the garden time well spent: She is happy to improve her production and increase her family's income further. The family helps her as well – her husband takes responsibility for the land preparation and irrigation of crops, while her nephew and niece help out when they can.

She much appreciates the support through the project; especially the production plan created together with B2B facilitators. The continuing training, support with market information, and linkages to traders assist her to be confident to produce and confident selling all her vegetables

What makes her most happy, is that she does not have to worry about school fees anymore. The family has enough food and income to support themselves well.



Photo 5: Mrs. Roth Kimher at her farm

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## Change of growing choice

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*"I really appreciate CHAIN project for providing very good technique and developing a market platform for my vegetables. Plastic house is a new hope for me to generate a sustainable household income"*

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Ms Vong Vanthan, is a farmer in Pong Teuk village, Orey commune, Thalaborivath district, Stung Treng province. Before she grew vegetable conventionally and only during one crop cycle a year for own consumption and selling some surplus to neighbors and local traders.

In 2015, CHAIN partners provided technical training in vegetable production CHAIN' partners. Ms. Vong Vathan now has changed her production cycles from one to three cycles a year due to the technical production improvement, market linkages, and input dealer access. The first two cycles she grew choy sum, Chinese kale, green mustard, and lettuce on her 160 m2 farm, generating an income of USD 480.

In 2017 she investing in a plastic hoop house, full of hope to grow safe leafy vegetable production to respond to new trends of market demand. She is sure that she can supply vegetable in the villages and local traders' whole year around. Her household income from vegetable, now, is about three times higher than conventional practice due to increasing yield, quality of product and the price.

She is happy to share her practical skills to other farmers in the area who seek for help. She can advise the other farmers about seeding selection, bed raising, seed sowing, applying fertilizer, and watering the crop.



Photo 6: Ms Vong Vanthan

### Agro-input dealer

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*"Partnering with CHAIN, made my business grow very fast"*

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Ms. Sotheara, is an agribusiness retailer in Stung Treng provincial town.

Since 2016, she has been involved with CHAIN project. CHAIN facilitated the linkages with other input suppliers and companies. Since then her business has increased in size and in product variety. The new private companies that supply her with the inputs also provided technical support. She increased her technical knowledge and received advice on how to attend clients.

Every day, between 40 to 60 farmers come to buy her products, both members of CHAIN and outside of the project. The most popular products include fertilizers, vegetable varieties, and trellising nets.

"The first investment capital has increased eight times. I started with USD 10,000, but now it increased up to USD 80,000. I am very happy with this result." said Ms. Theara. She is very happy to work with CHAIN project. To be a partner with CHAIN she grows not only business, but also network with both input suppliers/companies and producers as the primary clients.



Photo 7: Ms. Sotheara at her store

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### Angkor Green Company

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*"Farmers recognize and buy our products more and more. We hope to make our company well known and provide service to even more customers in the provinces"*

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Angkor Green Investment and Development Co.,Ltd (Angkor Green) is one of other active companies that cooperated with CHAIN project to supply good quality of agricultural inputs in the targeted provinces.

Angkor Green is very satisfied with the capacity building received from the project and reported an increased sales volume in the peak season and off-season (turnover of 350,000 USD, 30% from vegetables). Prior to its partnership with CHAIN, Angkor Green did not work in vegetable inputs and had no outreach in the CHAIN Provinces. However, after two years of partnership with CHAIN, Angkor Green now sells vegetable related inputs to an estimated 1,000-2,000 farmers within the four CHAIN provinces in both seasons.



Photo 8: Angkor Green staff advising farmers

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### Vegetable trader in Stung Treng

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*"I can buy vegetable as many as farmers have"*

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Mr. Hout Panha, is a vegetable trader at Srae Pour village, Sangkat Sreah Russey, Krong Stung Treng. He has received coaching in business and advise how to upgrade his business model from the CHAIN B2B facilitators.

Now, he links with traders in 4 other provinces of CHAIN. He works closely with six farmer groups; he always shares market information with all producers whenever he goes to collect the vegetables. He also advices farmers to grow crops with a higher market demand.

His current sales volume is 700 kg per day, with a profit between USD 50 to USD 75 daily. Before being involved with CHAIN, he used to buy small volumes of local vegetables from few farmers, but now with more farmers linked his business the volume has considerably increased.



Photo 9: Mr Hout Panha at farmer house