



HOW-TO GUIDES

IN AGRICULTURAL MARKET
SYSTEM DEVELOPMENT

**Market System
Development (MSD)
in CHAIN**

Applying market systems development
interventions in a practical way:
An introduction to the *How-To Guides*



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CHAIN

How-to Guides in Agricultural Market Systems Development

Market System Development (MSD) in CHAIN

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Foreword

Cambodia's agricultural sector shows continued growth both in production and export, despite the COVID 19 pandemic. Nevertheless, poverty remains largely a rural phenomenon, as about 80% of the 2.5 million poor people live in rural areas. Cambodian smallholder farmers' low productivity is the result of limited access to quality agricultural inputs, technical know-how and innovation, as well as limited marketing opportunities and market information. Pressure on water resources and the effects of climate change are additional challenges. Limited involvement of the private sector in agricultural extension services and weak cooperation with public sector actors restrain the development of prosperous smallholders. Cambodia is not self-sufficient in vegetables and fast economic growth has resulted in a higher demand for safe and quality local fruits and vegetables. This provides a huge opportunity for smallholder farmers and processors, particularly women, to increase income and food security. Moreover, improved rural infrastructure has increased the mobility of rural poor people, providing them access to diversified markets and job opportunities.

Responding to these challenges and opportunities, the Swiss Agency for Development and Cooperation (SDC) has developed the Cambodian Horticulture Advancing Income and Nutrition (CHAIN) 2014-2022 programme in close cooperation with the Ministry of Agriculture, Forestry and Fisheries through the General Department of Agriculture (GDA) and the provincial departments of Agriculture, Forestry and Fisheries (PDAFF). CHAIN has used a market development approach aimed at strengthening the inclusion of poor people (with a strong focus on women) in the market to secure better access to agricultural goods and service and to gain higher incomes. The key element of this approach is a facilitation process for involving private and public partners as well as civil society organisations in the delivery of goods and services on the input and output side of the horticulture value chains (e.g. extension, inputs, marketing and market information) that appropriately meet the needs of poor farmers and processors. Over the past eight years, we were able to achieve impressive results. Cambodia vegetable production has increased remarkably over the last 3 years and is now covering 68% of domestic market demand (700,000 Mt in 2020) compared to 422,000 Mt in 2013. Great achievement!

This How-to Guides in Agriculture Market System Development Book is a collection of tools, principles, practices and approaches developed during CHAIN implementation. It shall provide a reference for all stakeholders in agricultural value chains from public and private sector as well as the civil society. It is also a guide book for sustainability that is at the core of chain as it aims at strengthening horticulture market systems and the capacity of the sector actors to provide services to the targeted farmers. The established networks, policies and market systems will continue to function, as sector actors and farmers will have reached a critical mass large enough to become a profitable and self-sustaining market.

I would like to thank MAFF, GDA, Provincial Authorities, PDAFFs, and SNV and all involved people for an excellent collaboration and for actively contributing to the implementation of the CHAIN Project.

Markus Buerli
Director of Cooperation

Other guides in this series

- Facilitating Cluster Development
 - Facilitating B2B Relationships
 - Lead Farmer Incubator
 - Rural Business Accelerator
 - Developing Crop Budgets
 - Smart Water and Climate-Smart Solutions for Horticulture
 - Farmer Videos for Digital Extension
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1. Introduction

The Cambodia Horticulture Advancing Income and Nutrition (CHAIN) project has produced a series of How-To Guides (HTGs) that are meant to be practical, informative instruction manuals for those who wish to replicate and further develop the successful approaches used during the three phases of CHAIN. We hope that these HTGs will be useful to many organizations engaged in agricultural development that apply a market systems development approach. However, we have written the HTGs with Cambodian stakeholders in mind, mainly the Ministry of Agriculture, Forestry and Fisheries (MAFF), the General Department of Agriculture (GDA), the Provincial Departments of Agriculture, Forestry and Fisheries (PDAFFs) and local NGOs.

CHAIN follows a market systems development (MSD) approach in its design and implementation. This HTG is the first of the series. It focuses on introducing the market systems development (MSD) concept. CHAIN treated its target group as business women and men whose livelihood depends on

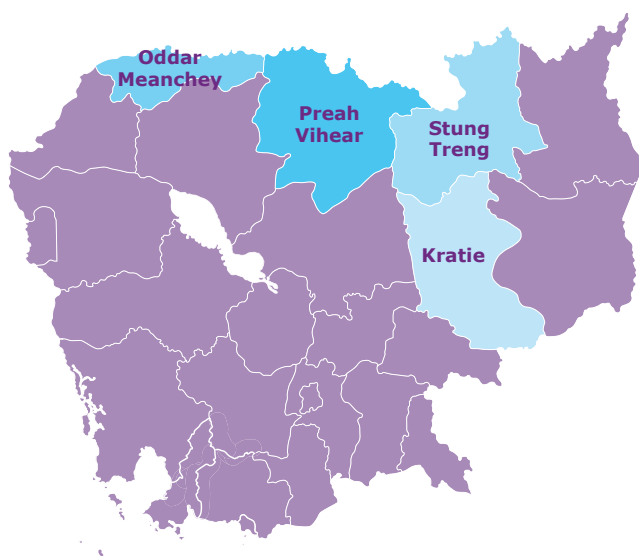
horticulture, and who need to develop their business capacity and build economically productive relationships with other business actors. CHAIN's interventions were designed so that everyone in the value chain could achieve potential higher incomes, creating win-win relationships by influencing different parts of the market system.

As the first of the series, this guide is meant to introduce the MSD approach and explain briefly how CHAIN implemented the approach. It gives a brief insight into how the other HTGs fit in within this series. This guide is not a full training document on market systems but rather an introduction on how it was applied in a practical way in the CHAIN project. For further information on market systems we refer to various documents and website sources in the text.



2. Background

CHAIN was an eight-year project divided into three phases (Phase 1 2014-2017, Phase 2 2017-2020 and Phase 3 2020-2022) that targeted four remote and poor provinces in Cambodia: Oddar Meanchey, Preah Vihear, Stung Treng and Kratie.



The overall goal of CHAIN was to improve livelihoods of poor women and men smallholder farmers in rural areas, through i) increased diversification of agriculture production among smallholder farmers; ii) increased incomes; iii) improved household food security; and iv) improved livelihood & climate resilience.

Horticulture is an important part of the agricultural economy of Cambodia due to the rapidly increasing urban consumption of fruits and vegetables. Until recently, more than 50% of all vegetables were imported from neighbouring countries capable of year-round production and equipped with better logistical networks. As a result that produce was more competitively priced. Imported vegetables, however, contain significant amounts of pesticide residue and are therefore a food safety concern. CHAIN worked on promoting safe, locally produced vegetables by working with many actors of the value chain and using interventions which strengthened the market system.

CHAIN interacted with and strengthened various actors of the market system:

Before CHAIN	After CHAIN
Little commercial vegetable production, with most vegetables imported from outside the province	Local supply of vegetables in the four target provinces increased from 30% to 70%.
Few farmers involved in commercial horticulture	The project reached 10,000 households in 400 farmer groups. Over 65% of the farmers reached were women. About 6000 farmers transitioned from household subsistence farming (homesteads) to semi-commercial or commercial operations.
Weak market linkages	14 business clusters were created and incubated with improved public-private collaboration and market linkages. 65 traders across the target provinces increased local sourcing.
Limited extension services	80 lead farmers provided services to their peers in the farmer groups through micro-businesses (vegetable collection, input selling, compost making, drip installation, net house repairs, etc). Input companies provide technical support. Locally produced videos on integrated pest management and yellow watermelon cultivation. Farmers share their experience via own made videos on Telegram groups.
No year-round production, limited resilience to climate change	Farmers adopted climate resilient technologies such as smart water management, and greenhouses. 20 smart water service and product providers linked to potential clients and marketed more climate smart water technologies.
Weak support services	Market services provided by public and private service operators improved, ranging from extension by the government, technical assistance by seed and pesticide companies, and embedded information and credit within the value chain.
Hampered enabling environment	4 provincial agricultural extension departments (PDAFF) and 4 local NGOs gained experience and capacity in facilitating a series of practical interventions to stimulate market systems development. Provincial and national governments created strategies for horticultural development, and contributed to a national horticultural policy.

The COVID -19 pandemic and its restrictions hit market actors in the value chain particularly hard. Nevertheless, resilience of the local vegetable chains helped them bounce back and return to increasing business and sales.

3. Introduction to Market Systems Development

Markets are important for economic growth and poverty reduction. Markets can offer the primary means through which poor women and men can participate in economic activities as producers, traders, service providers, consumers, and employees. However, markets can also exclude poor women and men with limitations in the opportunities to participate and benefit from economic growth. It is essential to understand how markets operate to be more inclusive, and how the poor can benefit from overall economic growth.¹

A market systems development (MSD) approach aims to address poverty by improving the performance of markets in a manner that is pro-poor and inclusive. The approach tries to understand and support changes in market systems to function more efficiently and sustainably for poor women and men.²

The objectives of market systems development are:

- To reduce poverty;
- To transform economic systems in which poor households could or do participate by buying and selling goods, services, or labour;
- To catalyse change in how these systems function – making markets more financially rewarding, accessible, inclusive, and resilient in the long term.³



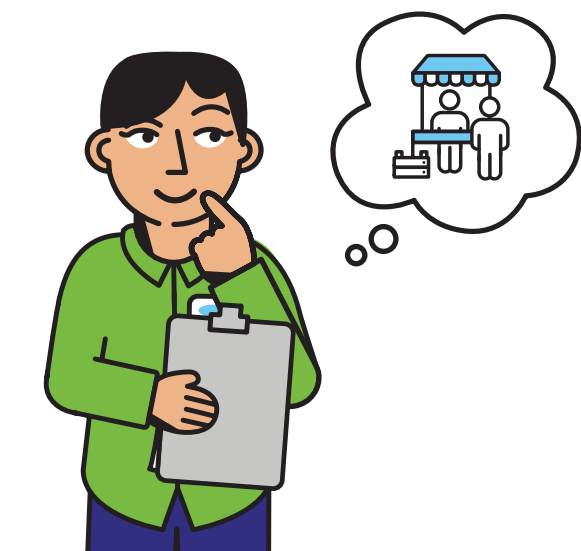
¹ <http://www.springfieldcentre.com/wp-content/uploads/2017/11/2004-07-MMW4P-an-objective-and-an-approach-for-governments-and-development-agencies.pdf>

² <http://www.springfieldcentre.com/wp-content/uploads/2015/11/2015-09-M4P-Op-Guide-Sept2015.pdf>

³ <https://beamexchange.org/market-systems/key-features-market-systems-approach/>

There are often complex reasons why markets do not work for the poor (market failures). The MSD approach digs deep into identifying the challenges and underlying constraints of why this is not happening and designs interventions to address it. A vital aspect of the MSD approach is that it works with market and enabling actors, which includes government, private sector, financial institutions, and research and academic institutions across different types of interventions.

Based on MSD best practices, Swisscontact, one of the consortium partners of CHAIN, has synthesized its global learning into four principles: systemic thinking, sustainability, facilitation, and large-scale impact.



Thinking systemically

The aim is to act strategically by tackling the underlying causes to ensure systemic change. This requires understanding of the market systems, and its sub-systems around the target group (i.e. input supply) and knowledge of roles and (power) relationships between actors and institutions.

Seeking solutions that are sustainable

The aim is to ensure and emphasize that changes made to the markets and behaviours between actors lasts beyond the lifetime of the project. By having a clear and realistic desired vision for the future, interventions can be shaped in the present. Sustainability is dependent on the incentives and capabilities of market actors (public and private) to succeed in the long-term (sometimes but not always through win-win situations).

Facilitating change in the market

The aim is to implement through facilitation which stimulates market actors to change their behaviour and foster collaboration. These actions should stimulate behaviour change but by letting the actors to do the work. Facilitators capture the interest and bring market actors together, build relationships, identify and strengthen business models, and provide catalytic support. Over time the role of the facilitator decreases while the role of market actors increases. The change needs to be owned by market actors.

Looking for wide-scale impact

The aim is to develop strategies that can be expanded successfully to reach large scale impact through market actors and systems change. Scale means targeting large numbers in the target group by either drawing in other similar market players or through a potential policy change which requires the adoption of change.

In summary:

- MSD is an approach to understanding and intervening in economies, to reduce economic exclusion and poverty.
- It attends to the performance of a particular market systems, so it becomes more inclusive, competitive, resilient.
- Its ambition is lasting changes (sustainability) that generates widespread benefits (impact at scale) for people living in poverty.

Key features of projects using MSD Approach

The starting point for any project using the MSD approach is to understand that poor people are part of the market systems, they participate as laborers, producers, suppliers, and consumers. Additionally, below are some key features of projects using an MSD approach:

- Projects conduct a thorough analysis of how the market systems operate and why systems function as they do. Understanding the market system is an ongoing process of researching, reviewing, and learning. Who are the market actors? How do market actors interact with each other? What are the problems and underlying causes that is limiting women and men from participating more equitably in the market? What is hindering poor people from benefiting from the markets?
- Market systems are dynamic in nature and understanding the market is an ongoing process as new actors enter the market, new opportunities emerge, and there are shifts in the relationships. Hence, projects need to be willing to be flexible and adaptive to respond to changes in the market and therefore, revise and adjust strategies, close no longer necessary initiatives, or undertake new activities.
- Partnerships with public and private actors are a key feature of the market systems development approach. Being strategic and deliberate in choosing partners to work with, implementers must analyze incentives and capacities of partners that are likely to continue participating in the business model even after the project ends. Ensuring that the proposed solutions/new business models are viable and sustainable to overcome the exclusion of poor women and men is critical to sustainability.
- Stimulating replications or “crowding in” by spreading changes in changes in roles, products, or behaviors beyond a few initial partners to a wider circle of market players and beneficiaries lies at the heart of the approach.



4. Moving from Value Chains to Market Systems

We will present here the basics of value chain thinking and market systems analysis. We only present here a summary. For more detailed information we refer to several handbooks on value chain development (VCD), and market systems development (MSD)⁴.

Value chain development refers to an approach which takes a product or commodity as the basis for analysis.⁵ Often it refers to a specific product for a specific market and, in rural settings, the product is often agriculture-based. The analysis is conducted on the whole trajectory for that product, from farming, harvesting, processing, and transportation to sale to the consumer. Value chain development is the art of establishing and strengthening strategic alliances of value chain actors to increase win-win profitability, competitiveness, inclusion, and sustainability. For instance, in Fig 1, you can see that a product is moving from farmers through traders, processors, and retailers to get to the consumers. In the value chain products move from left to right, and money and market information from right to left.

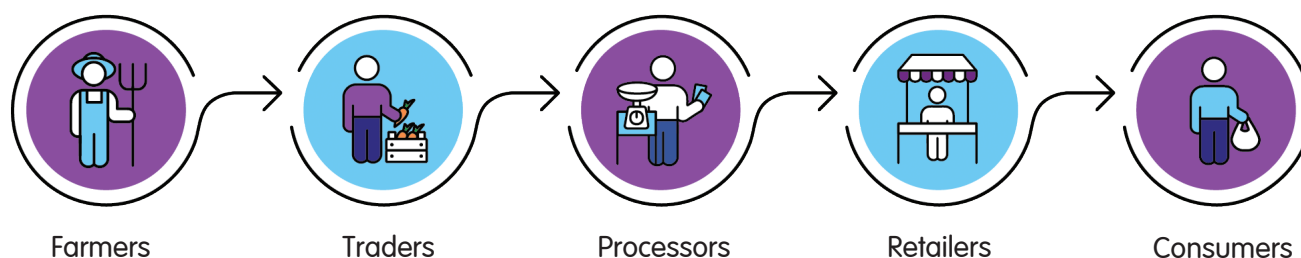


Figure 1: Example of horticultural value chain as found in CHAIN areas.

These actors in the value chain are the entities who own the product at a given moment. Projects that use a value chain development approach analyse the trajectory for the product and this analysis helps users to identify interventions that help the market actor to meet market demand, develop more rewarding market segments, increase value for actors through chain upgrading (improving productivity, quality, value distribution etc). In the value chain development approach interventions are implemented directly with the chain actors, often involving a business case with a chain champion /lead company.

Considerations in value chain development

For many organisations in Cambodia, agricultural development interventions start with a target group, usually smallholder farmers. The intervention is usually aimed at improving production volumes and methods. The project usually starts with the producers rather than with the markets (consumers or buyers) and may lack a clear market perspective. This is also known as a producer push approach. Cost benefit analysis, including labour requirements, of the proposed interventions may not be done. For many households it is not clear if the intervention will improve their socio-economic situation. Especially if the market linkages are not present, the implementing organizations may start buying and selling on the farmer's behalf or supporting the producer group and assume the role of a market actor - hence distorting the market and displacing the current market actors in the system. Most of these interventions end up not being commercially successful nor sustainable.

⁴ See BEAM exchange website for resources and webinars: <https://beamexchange.org/market-systems/>

⁵ <https://www.enterprise-development.org/implementing-psd/value-chain-development/#:~:text=In%20the%20Private%20Sector%20Development,the%20product%20is%20agriculture%2Dbased>



The market systems development approach looks beyond just the value chain and tries to understand the complexities of the market. MSD approach looks at the market systems as comprising of three sets of functions within which market actors can play a role: core value chain, supporting functions, and regulatory functions/enabling environment.

As shown in the figure 2, the market systems donut, the core of the market system is the value chain where the interaction between demand and supply takes place. Often this is not a simple relationship between one supplier and one buyer, but rather a value chain of relationships between many “actors” or players in the market and can be represented by a supply and demand side. The supporting functions are services that support the core market value chain. This could include supply of necessary production inputs, the extension market information that the farmers receive via government agents, or the availability of cold chain transport service to transport the product. It could include the financial services that are received by farmers, traders, or retailers.

The regulatory functions/ enabling environment include all the norms, laws, regulations, and other forces that impact how the system functions. This could include stereotypes about the roles of women and men, policies that govern the import of agronomic inputs, the establishment of quality standards, or the presence or absence of trust among market actors.

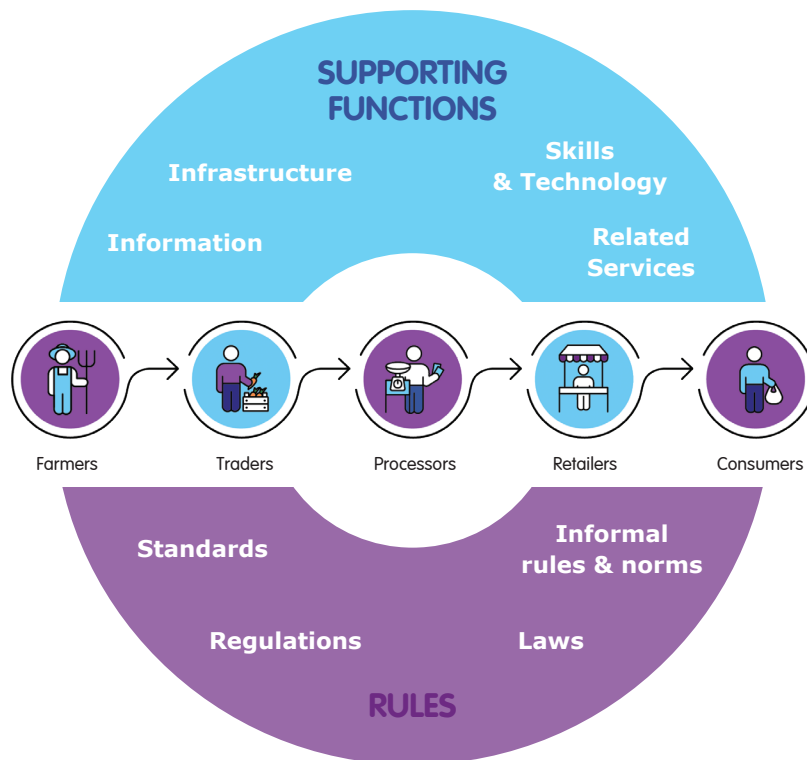


Figure 2: Modified by Market System Donut (beamexchange.com)

5. MSD approach in CHAIN

CHAIN looked very practically at the situation of the vegetable sub-sector. There were very few actors present in the provinces and weak market linkages between the actors. Most farmers were producing vegetables for their own consumption and selling little surplus at the local markets through spot buying. As the vegetable production was minimal, the supply chains were not well developed. CHAIN conducted extensive market research and dialogues with stakeholders such as local buyers, seed and input companies, government extension departments and farmers. CHAIN intervened to strengthen the value chain and support the wider market system for vegetables.



In MSD we speak often of light touch interventions. The project mainly facilitates dialogues, and agreements between actors for business to take place, including investments. Sometimes a more pro-active intervention is needed when markets are thin; i.e. when few business actors are active. Then to kick-start activities the project can do some pilot investments or co-invest together with the private sector. In choosing companies to co-invest we make sure that the company is representative for the sector and does not receive too much or too frequent development assistance ("free money"). This could crowd out other companies who might otherwise be interested in such subsidies to participate in market development.

CHAIN started to intervene on the production side first to boost production volumes and introduced new production technologies. In the second phase of the project CHAIN put more effort in streamlining the market linkages and matched supply with demand through cluster formation and production planning. In the third phase there was scope to upgrade the created value chains and improve productivity, quality, standards, year-round production, and climate resilience.

The project tried to understand the various issues underlying the poor development of the sub-sector. We tried to understand why the market was not solving the issues by itself, and how we could stimulate market actors to provide products and services which were needed. The CHAIN team designed interventions after many interviews, focus group discussions and interactions between market actors in multi-stakeholder dialogues. Most of the interventions were implemented together with market actors.

In the first 3 years CHAIN placed a strong focus on production (including knowledge, inputs, and technologies), building fundamental linkages among market actors (both private – buyers, traders, and input companies, and public – provincial departments of agricultural extension, and women affairs). The project supported capacity building among key players in the system, and improved business models of key individuals and organizations (e.g., helping farmers see first-hand the benefits of new inputs and practices, introducing the private sector to new market opportunities, and introducing NGO and government staff to the effectiveness of entrepreneurial and market development thinking – see farmers not as "beneficiaries" but as business people).



This first phase of CHAIN showed the production potential to many input & technology companies, highlighting that there was a potential market for them in the provinces. This focus was important to create critical mass of farmers who had a demand for products and services, thereby generating a market pull effect.

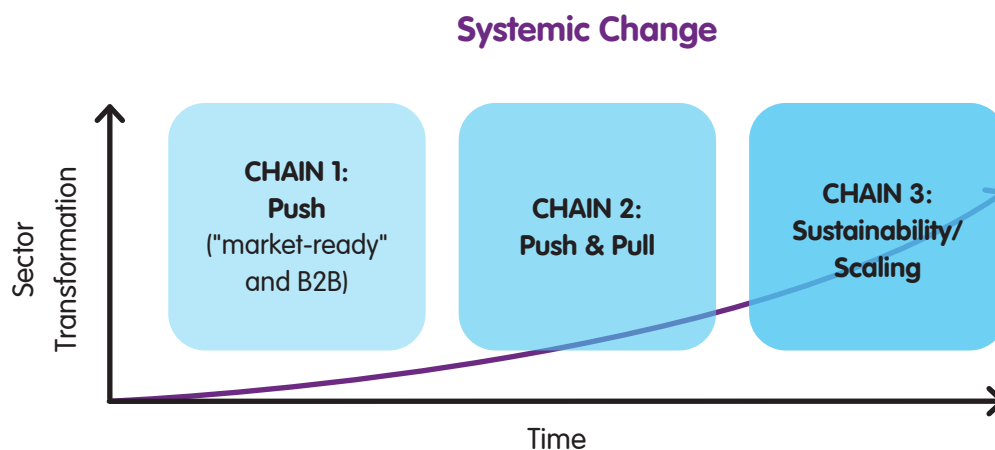
Not all farmers are the same.

Different farming households have different strategies and asset bases to run their farms. Some farmers have a more commercial inclination than others, willing to take more risk and invest more into the farm business. Other farmers are more focused on production mainly for home consumption and selling surpluses. CHAIN used this segmentation to develop specific strategies to support these farmers. Through these strategies farmers were able to graduate to more intensive and commercial forms of production for the markets. Training content used was different but equally different were the recommendations of type of vegetables to grow, and type of technology and markets to focus on. (See Annex I for a more detailed description of the farmer segmentation).



Over the subsequent three years the second phase of CHAIN built further on the support function to the value chains with deeper and wider improvements in the market system – working on push and pull effects, plus new, high-potential commercial models such as local retailers with increased sale of local fruits and vegetables and clusters that exported high quality vegetables to more profitable markets like Phnom Penh. The interventions were thought of as business cases: How can the service be provided as a business? Who would pay for such services in the future? Additionally, this phase of CHAIN was able to support and influence at national level policy development and national stakeholder collaboration.

The final phase of CHAIN emphasized further collaboration with national actors and agencies. They exert strong influence on the enabling and market environment in which the provincial markets are embedded. CHAIN supported the government on establishing, disseminating, and testing quality standards such as CamGAP and CamORG (for organic produce). CHAIN helped establish a certification and vegetable safety and quality testing laboratory. CHAIN supported the consultations for national horticultural policy and provincial strategies. These can be agents of change who help scale impact beyond the target provinces to the national level.

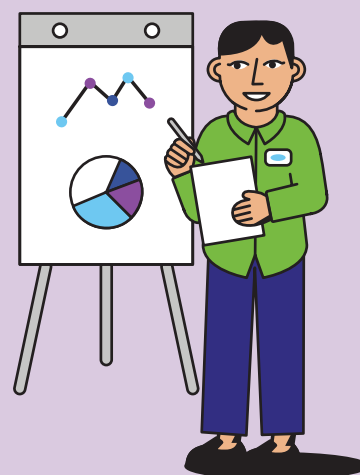


Below we highlight a few lessons learned in the context of market systems development approach as applied by CHAIN:

- Adaptive management:** The management of CHAIN was adaptive, allowing it to adjust according to the context, opportunities, and challenges. For example, in the earlier years, the project focused on accessibility of quality seeds, drip technologies, and other inputs. After successful market changes, the project moved towards supporting promotion of water access and abstraction to enable production in the dry season. In another example, the project targeted provincial consumers initially but later also piloted forward marketing to overcome temporary surpluses in supply and even contract farming with buyers from Phnom Penh especially for higher value crops. Stakeholder dialogues were issue based – those who needed to be there were invited, changing over time. This adaptive approach made it possible for the project to support stakeholders as new challenges arose and seize new opportunities that emerged.
- A **proven track record** and trust opened doors for additional facilitation and influence. Actors trusted the CHAIN team partly because CHAIN had a long term presence of 8 years in the provinces. Over time, CHAIN developed a proven track record and its team members established meaningful relations with stakeholders in the private, public, and development sectors. This meant that the project could facilitate new and more complicated collaborations. It also meant that the project was better able to influence national-level discussions through participation in policy discussions and forums, to facilitate crowding in other businesses.
- Exposing public sector representatives to innovation** can spark additional systems change. As many of CHAIN's approaches were new and innovative, the project received attention from a broad range of interest groups, including the public sector and other development partners. One way the project facilitated public sector exposure was through yearly monitoring visits by MAFF and MoWA, often alongside SDC (put people together in a bus for a few days). Through these visits, CHAIN bridged a gap between national and provincial level coordination, and it confirmed the importance of linking the national level senior officials with the groundwork being done by the provincial partners. Additionally, it sparked interest in learning about the innovative approaches, for public sector to integrate in future projects.

Monitoring changes in the market system

To understand the effects of the interventions, CHAIN used various ways to monitor the changes. The team, along with the PDAFF, interviewed market actors to detect behavior change - whether they felt more confident or trusted. The team conducted annual surveys with the farmers, input retailers and vegetable traders. This information was supplemented by key informant interviews and focus group discussions. Additionally, the team used farmer logbooks with key farmers to record details of their yield, input cost, labor days and sales. The team gathered other data from input sellers such as seed sales. This helped estimate production areas per crops and generated a more realistic picture of impact.



6. Key interventions in CHAIN

The CHAIN journey evolved over the years as the subsector changed and matured. CHAIN worked with a wide variety of market actors (farmers, traders, national buyers and both local and national input suppliers), bringing them together in various partnerships whilst also collaborating across different levels of government. As befits a highly experimental project, it used its failures as well as its successes to learn and adapt.

Along the way we realized that in Cambodia there is a dearth of material on practical approaches to agricultural market systems development. We hope to address this gap by documenting the CHAIN experience in a series of How-to Guides (HTG) that focus on the practical application of certain methodologies developed during the project's life cycle.

Each issue in the How-To series addresses one of the following topics:

- Facilitating cluster development
- Facilitating B2B relationships
- The lead farmer business incubator approach
- The rural business accelerator approach
- Developing Crop Budgets
- Smart water and climate-smart technologies for horticulture
- Farmer videos for digital extension



These guides can be useful for different agricultural value chain initiatives, as most of the principles and interventions they describe are widely applicable. They are intended for actors in the Cambodian development space, such as government technicians and extension staff, NGOs, students, and those working for private sector companies that participate directly in the value chain. We expect that some of the practical tips and lessons will also be useful for practitioners outside Cambodia. We hope that applying the recommendations outlined in these guides will lead to better, more inclusive, equitable, sustainable food systems.

Please find a brief description on each of the How-to Guides below:

1. MSD: Introduction to Market Systems Development

Description: Market Systems Development (MSD) approach aims to address poverty by improving the performance of markets in a manner that is pro-poor and inclusive. The approach tries to understand and support changes in market systems to function more efficiently and sustainably for poor women and men. The guide describes the why for MSD approaches, and the steps how to do them. It forms an introductory framework for all the other HTGs.

2. Facilitating Cluster Development

Issue addressed: Lack of market linkages, Lack of coordination in supporting services for information, inputs, markets, Lack of enabling environment.

Description: Clusters are concentrated groups of commercially oriented farmers which can create a critical market mass. The cluster will develop market linkages with buyers, input providers and service providers (financial institutions, extension agents, provincial government departments such as PDAFF, etc). From a market perspective its more helpful to work with clusters than the small, less developed farmer groups (especially the semi-commercial and home garden groups). The guide explains the rationale for clusters and a practical step-based approach.

3. Facilitating B2B relationships

Issue addressed: Lack of market coordination

Description: B2B concerns market facilitation, building better, more productive linkages between value chain actors and service providers. The guide explains when to use B2B and the steps, but focuses mostly on market research, production planning with farmers, and making deals with buyers and input suppliers.

4. Lead Farmer Business Incubator Approach

Issue addressed: Lack of extension services, adequate inputs, unsustainability of project contact farmer leads

Description: Lead farmers can solve the last-mile market linkage challenges, the fact that it is tough for farmers in more remote areas to connect with buyers and supporting service providers. Many programs train champion farmers to train other farmers and give them an incentive for this. However, as the program stops most of the champion farmers cease to provide the service. The incubator program was designed to help interested farmers start micro-businesses that could generate additional income while simultaneously addressing these market gaps in providing training to farmers, selling them inputs, and facilitating market linkage with buyers – all through their business.

5. Rural Business Accelerator Approach

Issue addressed: Lack of inputs, growth of SMEs, Business Development Services

Description: There is limited growth of many of the micro and small enterprises we worked with through B2B market facilitation. Like most family businesses, these businesswomen and men typically did not think about business plans, sales and marketing strategies, financial management and accounting (especially separating business and family finances), and human resource development, among other topics. The accelerator program supported the growth of businesses who were interested to increase size and income.

6. Developing Crop Budgets

Issue addressed: Lack of information for investment decision

Description: It's important to know if farmers can make a profit. For this one has to develop cost benefit analysis for the farm enterprise based on crop budgets. The guide explains how to do this economic analysis and some standard parameters and values for different crops.

7. Smart Water and Climate Smart Solutions for Horticulture

Issue addressed: Lack of appropriate technologies and service providers in water and climate resilience

Description: Water and climate are two major constraints within the horticulture market system. Technologies for year-round production exist but some technology service providers need support to grow and better commercialize their products. In addition to the technology sellers, it's important to have after sales service as well as public and private extension to create farmer awareness around these practices. The guide describes how to identify technologies, engage with service providers and SMEs, create a demand, and promote digital learning around climate smart horticulture and smart water solutions.

8. Farmer Videos for Digital Extension

Issue addressed: Lack of extension services and larger outreach

Description: With COVID-19 meeting and travel restrictions it was difficult to organise field level extension meetings and farmer field schools. CHAIN conducted research on the preferred digital communication and learning channels and YouTube videos were one of the most popular. CHAIN partnered with the private sector to produce some technical videos and share these to farmer groups through social media. CHAIN and the provincial department of extension also trained farmers on filming and editing videos on smart phones. Many farmers filmed and shared their experiences in land preparation, climate technologies, water management, crop growing techniques and crop disease management.

ANNEXES

ANNEX 1

Farmer Segmentation and Graduation

Various agricultural extension projects, or businesses struggle to reach scale for changing farmer behaviour to adopt new technologies, crops, or markets. This is usually because the services are poorly matched to the individual farmer's specific needs, or do not take account local infrastructure and resource limitations. The mismatch happens because the entire smallholder farmer population in any market is generally assumed to be a homogeneous group living in broadly similar conditions. Nothing could be farther from the truth. This "one size fits all" approach leads to many smallholder farmers being offered services that they do not consider relevant or cannot use, or afford. As a result, these services have little impact on farmers' livelihoods, and they are unlikely to recommend them to others.

A number of criteria are used to segment smallholder farmers into 3 different types:

- Subsistence smallholder farmers
- Commercialising smallholder farmers
- Diversifying or emerging farmers

Each segment is linked to different livelihood strategies⁶.

CHAIN segmented farmers along similar lines:

- **Homestead smallholder farmers**

are those cultivating small plots of vegetables mainly for home consumption using basic technology, family labour and little investments. Surpluses are traded. Vegetable sales are only a small part of their total income.

- **Semi-commercial smallholder farmers**

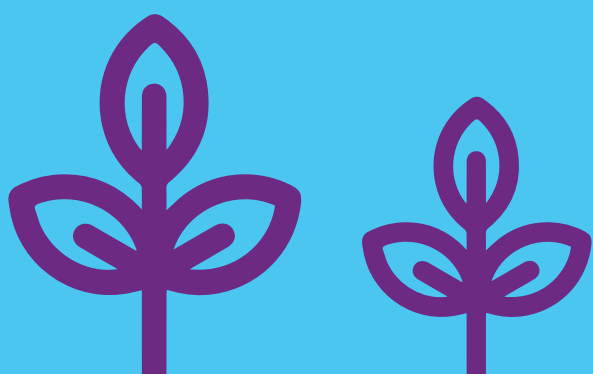
are those who grew on intermediate sized plots mainly for the market and home consumption using family labour. They do modest investments in technology.

- **Commercial smallholder farmers**

are those cultivating larger vegetable plots oriented at commercial markets (local or national), sometimes with long term supply arrangements. They have a high use of productive technologies and invest in improving the farm. Use mechanised land preparation, and water pumping. High use of hired labour.

⁶ See: DfID, 2015 DFID's Conceptual Framework on Agriculture; RAF, 2021 Understanding rural pathway Transitions; IDH & CGAP, 2020 Farmer Segmentation.

Criteria	Homestead	Semi-commercial	Commercial
Inputs	Mostly low external inputs or organic inputs and practices.	Purchase basic inputs of seeds, fertilizers and others agronomic materials.	Purchase most inputs of seeds, fertilizers, irrigations, seed trays and others agronomic materials.
Labor at farm	Use own household labor (woman/men).	Use own household labor and hire labor sporadically.	Hire women and men as labour.
Seasonality in production	Produce vegetables for 4-5 months per year during favorable season.	Produce vegetables for 5-6 months per year.	Produce vegetable year round, including off-season production.
Plot size	Plot size maximum is 150m ² with diverse nutritious crops.	Plot size minimum is 150m ² but have more than one crop.	Plot size minimum is 150m ² but have more than one crop.
Income/ consumption	Mainly grow vegetables for home consumption and other activities (agricultural and non-agricultural) are the main source of income.	Mainly grow vegetables for both sales and home consumption.	Mainly grow vegetables for commercial sales.
Climate smart production techniques	Apply basic improved techniques of raised bed, organic mulching, fenced gardens, quality seed.	Apply improved techniques of raised bed, plastic mulching, fertilizing, trellis nets, drip-irrigation and pest management.	Apply and invest in sophisticated techniques mechanised raised bed making, plastic mulching, (grafted) seedling production and planting, fertilizing, fertigation, integrated pest management, greenhouse production, post harvest management.



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