



FEED THE FUTURE

The U.S. Government's Global Hunger & Food Security Initiative



Farmers from Tasey Samaki Agricultural Cooperative, Cambodia; Photo credit: Miehbradt, Just Results

FEED THE FUTURE CAMBODIA HARVEST II ACTIVITY FINAL EVALUATION REPORT

FEED THE FUTURE MARKET SYSTEMS AND
PARTNERSHIPS ACTIVITY

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Abstract

This report presents the findings from the final evaluation of the Feed the Future Cambodia Harvest II activity (Harvest II) funded by the United States Agency for International Development (USAID) and operating from 2017-2022. The approach taken by Harvest II represented a shift in emphasis from previous USAID-funded activities that offered support to agricultural production, moving intentionally towards a demand-driven, market systems development approach. The evaluation team was asked to assess the extent and nature of system change that resulted from the activity, and how farms and firms benefited. The team also assessed whether and how the project contributed to resilience, climate change mitigation, and environmental stewardship.

Harvest II supported the development of three tree crop subsectors (cashew, mango, and longan) as well as vegetable crops. Findings differed across the two main types of crops, due partly to large variations in the market context. Tree crops faced a set of difficult circumstances including closed borders due to COVID-19, climate events, and structural constraints to moving up the value chain into processing activities and direct exports. Meanwhile, closed borders helped boost local demand for vegetables, which are consumed locally.

The evaluation found that Harvest II did promote system change, though unevenly across the subsectors and with more focus on growth than inclusion. A foundation was built for private-sector driven market development to be supported by the government, however policies and strategies developed have not yet been carried through to the practical implementation stage, which is needed for firms and farms to benefit. Within the private sector, in terms of market linkages and competitiveness, important relationships were established and positive examples supported, with improved practices, increased yields, expanded sales, and new product development among results reported. The degree to which these had an impact on actors beyond direct beneficiaries and whether they will be sustained remains to be seen.

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ACRONYMS

AC	Agricultural Cooperative
AIMS	Accelerating Inclusive Markets for Smallholders
BEE	Business Enabling Environment
CAC	Cashew Nut Association of Cambodia
CACA	Cambodia Agricultural Cooperative Alliance
CamGAP	Cambodia Good Agricultural Practices
CHAIN	Cambodia Horticulture Advancing Income and Nutrition
CSC	Chey Sambo Cashew Nut Processing Handcraft
DI	Direct Impact
ELC	Economic Land Concession
EMMP	Environmental Mitigation and Monitoring Plan
FGD	Focus Group Discussions
FI	Financial Institution
GDA/MAFF	General Directorate of Agriculture/Ministry of Agriculture, Forestry, and Fisheries
GDP	Gross Domestic Product
GHG	Greenhouse Gasses
HACCP	Hazards Analysis and Critical Control Points
HCST	Handcrafted Cashew Nut Stung Treng
IDI	In-depth Interview
IPM	Integrated Pest Management

ISO	International Organization for Standardization
KII	Key Informant Interview
MAFF	Ministry of Agriculture, Forestry, and Fisheries
MFI	Micro Finance Institution
MSD	Market Systems Development
MSMEs	Micro, small and medium enterprises
MSP	Market Systems and Partnerships
MEL	Monitoring, Evaluation and Learning
MoC	Ministry of Commerce
MoE	Ministry of Environment
PDAFF	Provincial Department of Agriculture, Forestry, and Fisheries
PSE	Private Sector Engagement
PERSUAP	Pesticide Evaluation Report and Safe Use Action Plan
RGC	Royal Government of Cambodia
ToC	Theory of Change
USAID	United States Agency for International Development
WEAMS	Women's Empowerment and Market Systems
ZOI	Zone of Influence

Executive Summary

The Feed the Future Cambodia Harvest II activity (Harvest II) funded by the United States Agency for International Development (USAID) operated from 2017-2022 with a budget of \$21.2 million. It aimed to increase sustainable economic opportunities in the horticulture sector in Cambodia.

USAID/Cambodia contracted Market Systems and Partnerships (MSP), with subcontractor Just Results, to conduct a final evaluation of the Harvest II activity to determine the degree to which Harvest II achieved its purpose and its potential sustainable outcomes with a focus on four evaluation questions:

1. What systemic changes has Harvest II made progress on and to what extent have the changes been sustained and scaled?
2. How have the systemic changes benefitted market actors, specifically male and female farmers?
3. How has Harvest II contributed to climate change objectives, aka helping farmers and actors improve resilience to climate change impacts and reduce greenhouse gas emissions? How have the commodities selected contributed to this equation?
4. What has Harvest II done to prevent negative impacts on the environment when providing grants to firms?

This document summarizes the findings of the evaluation and provides recommendations for Harvest III and USAID/Cambodia.

Summary of Harvest II

Harvest II focused on increasing value chain competitiveness and removing obstacles to market access. It had three sub-objectives: improved capacities for market participation, improved market linkages and improved governance and enabling environment. At the system level, Harvest II aimed to make the horticulture market system more competitive, inclusive, and resilient.

Harvest II evolved over the project period. In its second year, the project moved from a buyer-led approach to a market systems development (MSD) approach, and focused primarily on four crop subsectors: mango, longan, cashews and vegetables. Harvest II initially focused on four provinces around the Tonle Sap Lake, while later expanding into adjacent provinces. When the COVID-19 pandemic struck, Harvest II had to adapt both its own operational approaches as well as its strategy, in order to help market actors respond to this significant and long-term shock.

Evaluation Approach and Methodology

The evaluation had three phases:

1. **Desk Review and Evaluation Design:** The evaluation team conducted a desk review of documents from Harvest II and held several workshops with Harvest II team members to inform the evaluation design.
2. **Field Work:** The evaluation team employed a range of methods to gather information including reviewing secondary sources, interviews with 14 key informants, 51 market actors reached by Harvest II and 11 market actors not reached by Harvest II, discussions with 84 mango, longan

and cashew farmers, and a survey with 350 vegetable farmers, 300 reached by Harvest II partners directly and 50 who learned from those reached directly.

3. **Analysis and Validation:** The evaluation team conducted both quantitative and qualitative analyses designed to address the four evaluation questions. Following preparation of a draft report, the Evaluation Team conducted a workshop with USAID/Cambodia, MSP and Harvest III staff to validate the findings of the evaluation and co-create recommendations.

Data collection and analysis were gender-sensitive, seeking out the perspectives of both males and females and explicitly considered gender as a variable when analyzing adoption of new practices and changes in the subsectors more broadly. The data collection also captured the perspectives of youth, when possible. To assess the extent to which Harvest II contributed to changes observed in the horticulture sector, the evaluation team employed a theory-based approach complemented by a strong focus on triangulating participant opinion.

Context of the Subsectors

Cambodia experienced tremendous economic growth from the 1990s through 2019. While agriculture averaged 30% of GDP from 2000-2014, by 2019, it had dropped to 22%. Nevertheless, 50% of Cambodia's households are involved in agricultural production, and 37% of the workforce is employed in the sector. Cambodia is highly vulnerable to the impacts of climate change, including an increase in precipitation, temperatures and intensity and frequency of climate hazards.

The context of the vegetable subsector is very different to the three tree crop subsectors – mango, longan and cashews. Cambodian vegetables are mostly consumed locally. The General Directorate of Agriculture (GDA) estimates that Cambodia has reduced its imports of vegetables from 70% to 40% of domestic consumption over roughly the last decade. In contrast, the bulk of mangoes, longans and cashews are sold fresh to Thailand and Vietnam for re-export. This has not changed substantially since 2017, despite broad agreement that increased processing and direct exports would benefit the Cambodian economy. Over the project period, the tree crops faced a myriad of structural constraints and were strongly, negatively affected by shocks, including border closures, movement restrictions and adverse weather, while Cambodian vegetables faced rising demand, diminished competition due to COVID restrictions and fewer structural constraints. Therefore, there was more system change overall in vegetables compared to tree crops, which affected the intervention options available to Harvest II.

System Change and Benefits for Farmers

Competitiveness. In the **vegetables** subsector, Harvest II made valuable contributions towards the trend of substituting imported with locally produced vegetables. The project significantly contributed to a number of dimensions of system change critical to competitiveness including buyer-supplier relationships, firms' and farmers' abilities to meet market demand including new and premium opportunities, value chain efficiency particularly improved linkages among value chain actors, and certification relevant to premium markets. For example, Harvest II facilitated links among value chain actors such as input suppliers, farmers, agricultural cooperatives, buyers, retailers and service providers. Harvest II partner firms and agricultural cooperatives were among the leading buyers providing their

supplier farmers with information on demand, technical assistance and links to better inputs. As a result, farmers and buyers have substantially increased their understanding of demand. Along with other projects and government efforts, Harvest II was a contributor to innovations in the vegetable subsector, such as new, environmentally-friendly inputs, to farmers' access to training and technical support, to farmers' adoption of technologies such as drip irrigation and net houses, and to improving public-private coordination.

In the **tree crops** subsectors, Harvest II aimed to facilitate a shift toward more domestic processing and sales and more direct exports. Harvest II was instrumental in enabling firms to survive the significant shocks during the project period and in facilitating the emergence of positive examples of domestic processing and sales and direct exports, one key step in driving competitiveness. For example, Harvest II supported Misota Foods to get international certifications, diversify their products, initiate sales to new domestic markets and connect with new international buyers, positioning the company to better serve demand in new and premium markets.

There are several dimensions where Harvest II was a key driver of steps towards system changes in tree crops that advanced overall competitiveness. These include firms' and farmers' abilities to meet market demand, including new and premium market opportunities domestically and internationally, and national and international certifications. Harvest II provided training and information to firms on export markets, enabled firms to connect with new buyers, supported small processors to develop new products, facilitated linkages among firms, supported associations and enabled firms and farmers to gain certifications relevant for international markets. Harvest II also contributed, along with other projects and government efforts, towards value chain efficiency, improved financial services, the articulation of government strategy and development of key policies, and increasing innovation in tree crop subsectors.

Harvest II worked with firms in tree crops to start or strengthen coordination with farmers. In some cases, firms and farmers benefited from improved coordination with commensurate increases in trust. In other cases, shocks or gaps in Cambodia's supporting services and enabling environment derailed firms' plans to expand or reach new markets, which disrupted relationships with farmers. For example, numerous cases were reported where firms were negotiating an order with a foreign buyer that fell through due to the inability of the firm to meet buyer requirements or logistical challenges, which meant that firms purchased less fruit than they had planned. Farmers interviewed in focus group discussions reported that roughly 60-70% of buyer-supplier relationships did not work out as planned, resulting in unrealized expectations such as buyers not providing training as discussed, buyers owing money to agricultural cooperatives or farmers for fruit that had been collected but not paid for, and buyers only purchasing fruit as planned with the farmers for one year or not purchasing fruit at all due to buyers facing reduced demand or cancelled orders. While many firms reported that farmers made the improvements they asked for, a few reported unrealized expectations such as farmers not complying with product specifications, not taking care of fruit trees properly or selling fruits to other buyers despite agreements. These types of experiences increased the skepticism of some farmers and firms towards more formal and multifaceted relationships. Greater attention to resilience, planning for disruptions and a wider range of interventions to address missing functions would give firm-farmer relationships a greater chance of sustained success.

Inclusion. The evaluation found that there was often more demand than supply of local vegetables during the project period, increasing farmers' power and influence. Harvest II, other projects, agricultural cooperatives and farmers themselves capitalized on this opportunity by increasing coordination among farmers in production and sales. Increasingly stable relationships are emerging among quality vegetable producers and urban retail outlets, with improved negotiating capacity of producers. For example, Harvest II supported Tasey Samaki Agricultural Cooperative (TSAC) to provide extension services to farmers, help farmers get Cambodian certifications, and reach new buyers, among other improvements. TSAC leadership reported that they are now more confident in approaching buyers and have more balanced negotiations with them.

Concerningly, some vegetable buyers are establishing or expanding their own farms to avoid or limit interactions with smallholder farmers. While these buyers can be expected to continue buying from smallholder farmers, they may reduce or limit purchases as they expand their own farms. To manage the risk that this might reduce smallholder farmers' participation in value chains serving middle and upper income consumers in the future, it will be useful for Harvest III and USAID to understand this trend and outline how smallholder farmers can further build their competitive advantage in order to continue playing a central role in serving growing vegetable markets.

In contrast, power and influence in tree crops have remained largely static, with unstable commercial relationships favoring firms. Harvest II worked with socially motivated buyers who shared power with farmers in more stable relationships, supporting several firms to become models of ethical and effective relationships with their suppliers. These firms have not yet influenced others, as their changes are recent and current market conditions put smallholder tree crop farmers at a disadvantage in Cambodia. Given the challenges of reaching new international markets, some companies supported by Harvest II to expand their supplier base purchase only from a subset of suppliers each year based on their needs. In addition, some buyers are establishing or expanding their own farms to better control supply and quality. As they expand their own farms, there is a risk that they will reduce or limit their purchases from smallholder farmers. It is recommended that Harvest III customize the tree crop strategy more closely to this subsector context, for example by expanding approaches that have proven successful in addressing power imbalances, such as farmer certification and farmer collective action, and by prioritizing interventions to address gaps in specialized services and the enabling environment to support direct exports.

The evaluation findings indicate that women's roles, access to opportunities, decision-making power and leadership have remained mostly the same in the four targeted subsectors. Before Harvest II started, women were already playing significant roles in horticulture, particularly in vegetables, and they have continued to do so as production expanded or profitability increased. There are positive examples of Harvest II supporting women leaders and enabling these women leaders to get access to more opportunities. For example, Harvest II and other projects supported Handcrafted Cashew Nut Stung Treng (HCST), a female owned and managed cashew processing business, to develop and expand, resulting in the company doubling its staff size and increasing its supplier base from 60 to 100 farmers.

There is no evidence yet that Harvest II catalyzed changes in women's access to productive resources, opportunities or leadership on a wider scale. Some negative aspects of inclusion persist, such as female farmers' membership in cooperatives being lower than male farmers and women feeling they have less

influence in transactions than men. Understanding the structural constraints to gender inclusion and integrating efforts to address them in the project strategy and interventions can help Harvest III expand impacts on gender equity.

Resilience. The last three years have highlighted significant weaknesses in the resilience of horticultural value chains in Cambodia. Further increases in risk can be expected as climate change and global instability increase. Harvest II contributed to improving resilience by catalyzing increased linkages among firms, building longer-term relationships among farmers and buyers, promoting practices, technologies and the provision of information that help farmers conserve natural resources and adapt to climate change, and increasing the diversity of products, business models and markets. Behavior changes were more likely to be sustained and benefits more likely to be realized when Harvest II addressed the specific risk factors for farmers and firms. Increased focus on resilience will be a key factor in catalyzing further positive system change.

Impacts on Farmers and Other Market Actors. More than 70% of vegetable farmers surveyed felt they had increased yields compared to before interacting with a Harvest II partner. Many vegetable farmers also benefited from increased and more reliable income, with similar results between male and female farmers. Participation in strengthened agricultural cooperatives and contract farming is increasing farmers' influence and control. Those farmers who obtained CamGAP certification have particularly increased their bargaining power as buyers are increasingly looking for both certification and the improved quality that comes with it.

Tree crop farmers cited a range of benefits they gained from their involvement with Harvest II partners, particularly from training, including cost savings and increased yields. Those farmers who received food safety training and CamGAP or organic certifications benefited more than others because they sold their products at higher and more stable prices.

Due to shocks and price volatility, the majority of tree crop farmers interviewed did not feel they have earned more income since their involvement with Harvest II partners, with notable exceptions, particularly in longan, where increased local processing had a positive local effect on prices. Most of the farmers interviewed who applied CamGAP training were men, with women who were trained often citing the high costs of the practices or no interested buyers as reasons not to apply. Concerningly, there were a few farmers across the tree crop subsectors who took loans to invest in new inputs, technologies and/or practices taught through training supported by Harvest II, but were unable to pay the loans back on schedule due to low yields caused by poor weather or inability to sell. These findings indicate that the focus Harvest II put on sustaining and building local demand in tree crops was important; expansion of this effort will be valuable. It is also essential to further increase farmers' resilience so that they can mitigate and recover faster from shocks. Furthermore, it is important to understand and address the specific constraints women face in adopting new practices.

Conclusions. Overall, Harvest II was a key contributor to examples of improved business models among firms. The majority of value chain firms supported by Harvest II are sustaining at least some of the changes that they made, such as providing information to farmers and reaching out to new markets. Within vegetables, firms and farmers with support from Harvest II typically adopted multiple changes that enabled them to take advantage of market trends. Farmers reached directly by Harvest II partners

on average adopted 4.5 new practices out of an average of 6.2 on which they received information, for an adoption rate of 73%. Farmers felt that they benefited from almost all practices they adopted.

While there is not yet evidence of partner firms influencing the behaviors of other firms, the existence of positive examples is a necessary step towards system change. There were challenges to the sustainability of improvements among some market actors. For example, some farmers did not continue with new practices due to high costs or difficulties in implementing new practices. Some firms were not able to sustain new practices due to costs, insufficient volumes of sales or shocks. Additional time is needed to assess the sustainability and scalability of newly developed products, business models and market linkages. A wider range of interventions that lower barriers for firms and farmers to adopt new practices, as well as gathering and using feedback to find ways to lower the costs or challenges in implementing new practices could help to stimulate wider system change.

In the tree crops subsectors, more intensive interventions, where Harvest II and often other projects provided multiple forms of support to individual firms or cooperatives, were more impactful than extensive interventions such as only training or networking support. Given the multiple, significant barriers in tree crops, the intensive support enabled firms to make substantial improvements, becoming models discussed among other market actors. In contrast, some firms that received only training, for example, have made more modest improvements and their commercial viability is not yet assured. In vegetables, both intensive and extensive interventions were impactful, as firms faced fewer barriers and thus could more easily address some constraints without external support.

Harvest II focused its business enabling environment work on policies and some regulations, contributing to changing mindsets about the role of the public versus private sectors and allowing Cambodian government officials to benefit from multidisciplinary expert input. In addition to inadequate policies, there are other business enabling environment challenges at every level of the value chain in all four subsectors, which significantly affected the progress of system change. No explicit work has been done on organizational capacity and administrative procedures that often cause significant challenges for firms and farmers, such as inspections and phytosanitary certificates. Targeted interventions at these levels could make it easier for firms and farmers to make the changes promoted by other components of the project.

Climate Change Objectives and Environmental Stewardship

Climate Resilience. Farmers, and to a lesser extent other value chain actors, are experiencing considerable negative impacts from climate change. Harvest II and other projects and organizations promoted technologies and practices to help farmers adjust. Vegetable farmers have benefited from more options, while many tree crop farmers feel they are at the mercy of the variable weather that has damaged crops over the last few years.

Vegetable farmers are benefiting from Harvest II promoted technologies and practices that support climate change adaptation. Of the vegetable farmers who got information on smart irrigation (e.g. drip) from Harvest II partners, 78% adopted it and 98% of those felt they benefited. The adoption of inexpensive practices, such as production of healthy seedlings, was widespread. Nethouses are becoming more widespread, although costs are limiting adoption, which stands at 27% of those who got

information from a Harvest II partner. Building the capacity of Harvest II partners, including buyers, cooperatives and inputs suppliers, to sustainably provide information to farmers on climate adaptation has perhaps been the most important contribution of Harvest II on this issue. Harvest III could further build on progress by working with market actors on lowering costs of technologies and sustainable financing solutions for purchasing technologies.

The promotion and adoption of climate adaptation technologies and practices was lower in tree crops, although important improvements were still made. Harvest II contributed to increasing the provision of information to farmers from buyers and associations as well as promoting practices that conserve natural resources and help farmers adapt to climate-related changes such as lower water availability. The evaluation indicated that other organizations and channels, such as Telegram groups and government agencies, were significant drivers of climate change adaptation among tree crop farmers. Overall, tree crop farmers reported that they are struggling to adapt and experiencing significant losses due to adverse weather. Harvest III could increase farmers' abilities to adapt to climate change by supporting innovation in risk management services, complemented by other, USAID sponsored efforts to support longer-term climate change adaptation.

Greenhouse Gas Emission Reduction. Horticulture contributes to climate change mitigation because trees and plants absorb carbon dioxide. For example, a study found that mango trees could sequester carbon at a rate of seven times the rate of carbon emissions from production of mangoes.¹ Nevertheless, some activities in horticulture produce greenhouse gasses (GHGs) including production of fertilizers and pesticides, waste decomposition, fuel and electricity usage in firms and farms, and tillage. While reducing GHG emissions was not a focus of Harvest II, some interventions did contribute to this aim, for example promotion of solar energy for farms and firms, smart irrigation, reduced chemical use and waste reduction.

Choice of Crops. While climate change objectives were not considered in the choice of target crops, those targeted by Harvest II were reasonable choices. Cashews are drought and heat tolerant, although longans require access to irrigation and mangoes have high water usage. Nevertheless, there is evidence that tree crops absorb more carbon than common substitutes, particularly cassava. In general, evidence indicates that how crops are grown is more important to climate change objectives than which crops are grown. While Harvest III can focus on other criteria, particularly market demand, when selecting target crops, further promoting practices among firms and farmers that address climate change objectives will build on the progress from Harvest II.

Preventing Negative Environmental Impacts. Harvest II consistently followed good practices in identifying and addressing environmental risks when providing grants to firms. Partner firms gave examples of changes they made to meet Harvest II requirements, such as building a wastewater treatment system. Harvest II grants also often provided funds to train farmers in good agricultural practices including minimizing negative environmental impacts. Evidence from the evaluation suggests **firms will continue with the good** environmental practices started with Harvest II support. Harvest II

¹ Fitzpatrick, J. (2021). Situational Analysis – Cambodian Mango Sector. USAID Feed the Future Harvest II.

also supported a number of firms that are models of good environmental practices. The sustainability of new practices among farmers is likely to be mixed. Some farmers felt the practices increase yields and were committed to sustaining them, while others, particularly women, were not able to sustain practices due to costs or difficulty of application. Most firms said they intended to continue the provision of training to farmers started with Harvest II support on a reduced level. Analyzing and addressing the barriers to sustainability of practices will further enhance the project’s approach.

Recommendations

The recommendations below summarize and extend those developed during the workshop with USAID/Cambodia, MSP and Harvest III.

Recommendation I: Strengthen the process for promoting system change

Who?	What?
Harvest III	<ul style="list-style-type: none"> • Building on progress to date, strengthen an explicit and systematic, iterative MSD process of subsector analysis, development of a subsector vision and strategy, constraints analysis, defining expected subsector changes, developing and implementing interventions with market actors, monitoring behavior and system changes, assessing the project’s contribution to change and feeding analysis into strategy and intervention revisions; an annual cycle is typically appropriate. • Document the subsector analysis, subsector vision, specific desired dimensions of system change, expectations for change within the life of the project, subsector strategy and interventions, to help staff, subcontractors, USAID/Cambodia and other stakeholders to buy in to the vision and approach. • Involve subcontractors more in the iterative MSD process; consider involving other stakeholders in aspects of the process.
USAID/Cambodia	<ul style="list-style-type: none"> • Allow for a longer-term focus on specific subsectors, with the decision to change or add taken with due consideration to the time required to achieve system change. • Support greater accountability for adhering to the MSD process systematically and iteratively by monitoring it and encouraging reporting on these internal activities. • Agree on expected system changes and likely timeframes for MSD activities; discuss and adjust these annually; ensure targets are aligned to support agreed system change aims.

Recommendation 2: More closely align strategy with the subsector context

Who?	What?
Harvest III	<ul style="list-style-type: none"> • Increase the customization of the strategy for each subsector to the context of that subsector, considering the intensity and diversity of interventions, as well as the activities of other projects, development partners and institutions. • Ensure that the strategy considers all the changes in the subsector required to achieve the vision. • Recognize that system change will take longer in weaker subsectors than in stronger ones and outline expectations for system change and targets accordingly.
USAID/Cambodia	<ul style="list-style-type: none"> • Adjust expectations per subsector depending on the strength and momentum in the subsector, recognizing that not all required changes will necessarily benefit target groups within the life of the activity, particularly in weaker subsectors. • Provide additional flexibility to MSD activities to allow them to address the range of constraints needed to achieve an agreed expectation for system change. • When working in weaker subsectors, ensure successive activities are guided by a realistic but long-term vision of system change.

Recommendation 3: Explicitly address structural barriers to inclusion

Who?	What?
Harvest III	<ul style="list-style-type: none"> • Update assessments of the trends and barriers to inclusion, incorporating farm/firm size as well as gender and age. • Integrate approaches to addressing the structural barriers to inclusion more systematically into strategies and interventions and develop targeted interventions on inclusion when needed. • Facilitate additional support for smallholder farmers and small firms based on the barriers to them participating more effectively in value chains. • Intensify efforts to address power imbalances between smallholder farmers and buyers in tree crops using approaches that have proved successful in Harvest II.
USAID/Cambodia	<ul style="list-style-type: none"> • Encourage broadening of current approaches to inclusion to increasingly address structural barriers to more effective and beneficial participation in subsectors. • Drive consensus with MSD activities on a vision for each subsector that incorporates inclusion, and further encourage specific strategies to address that. • Widen the definition of inclusion to address smallholder farmers and small firms in horticulture subsectors, as well as persistent power imbalances.

Recommendation 4: Increase the focus on building resilience

Who?	What?
Harvest III	<ul style="list-style-type: none"> Expand and intensify work on resilience for firms and farms using successful approaches from Harvest II, including the promotion of appropriate techniques and technologies and wider dissemination of information. Consider increasing interventions to develop and expand risk management services relevant to horticulture farmers and firms. Explicitly integrate risk planning into all relationship building efforts.
USAID/Cambodia	<ul style="list-style-type: none"> Expanding on guidance to date, further encourage subsector visions and strategies for MSD activities that incorporate resilience, addressing the risks specific to targeted subsectors. Consider a longer-term effort to contribute to strategic research, development and planning on climate change adaptation in Cambodia, potentially in the context of a wider regional or global effort.

Recommendation 5: Enhance monitoring and adaptive management

Who?	What?
Harvest III	<ul style="list-style-type: none"> Refine the monitoring and results measurement system to enhance qualitative information collection and include regular assessment of system change using relevant dimensions. Enhance the system for internal reviews and adaptive management, incorporating greater participation of staff, long-term consultants, implementing partners and other relevant stakeholders.
USAID/Cambodia	<ul style="list-style-type: none"> Leveraging existing processes, structure annual dialogues on strategies and targets after the annual internal reviews in MSD activities. In addition to the disaggregation of quantitative results, require qualitative reporting on progress towards system change, particularly inclusion and resilience. Further build flexibility for MSD activities to respond robustly to findings from monitoring and assessment of system change.

I Introduction

The Feed the Future Cambodia Harvest II activity (Harvest II) funded by the United States Agency for International Development (USAID) operated from 2017-2022 with a budget of \$21.2 million. It aimed to accelerate the growth of the commercial horticulture sector in four provinces in order to increase sustainable economic opportunities in Cambodia. The Feed the Future Market Systems and Partnerships (MSP) Activity is an \$80 million global mechanism to advance learning and good practice in market systems development and private sector engagement within USAID (Washington and Missions), USAID implementing partners, and market actors.

USAID/Cambodia contracted MSP, through subcontractor Just Results, to conduct a final evaluation of the Harvest II activity to determine the degree to which Harvest II achieved its purpose and its potential sustainable outcomes with a focus on four evaluation questions (detailed in Section 3). The evaluation focused on the main crops Harvest II targeted: mangoes, longans, cashew nuts and vegetables.

The primary audience for the evaluation is the USAID/Cambodia Mission Sustainable Economic Growth Office. The secondary audience is the Harvest III team, who may apply relevant findings and lessons learned to the effective implementation of this subsequent project. The third audience is other relevant stakeholders including the implementing sub-partners, Emerging Markets Consulting (EMC) and International Development Enterprises (iDE), and relevant government agencies. An additional audience is the global community of market development and climate sensitive programming practitioners and development partners that may be able to draw transferable lessons to other contexts.

This document summarizes the findings of the final evaluation and contains the following sections:

- **[Section 1 Introduction](#)**: presents an overview of the evaluation and this report;
- **[Section 2 Background and Context of Harvest II](#)**: describes the Cambodia context overall and the horticulture sector over the project time period, as well as the Harvest II activity;
- **[Section 3 Evaluation Purpose and Questions](#)**: briefly outlines the purpose of the evaluation and the evaluation questions;
- **[Section 4 Evaluation Approach and Methodology](#)**: summarizes the evaluation approach, methodology and limitations;
- **[Section 5 System Changes](#)**: discusses the evaluation findings and conclusions on progress towards catalyzing system changes that are sustained and scaled;
- **[Section 6 Benefits for Farmers and Other Market Actors](#)**: presents and analyzes the findings on benefits for market actors, particularly male and female farmers;
- **[Section 7 Climate Change Objectives](#)**: explains the findings on the project's contributions to climate change adaptation and mitigation;

- **[Section 8 Preventing Negative Environmental Impacts:](#)** describes and analyzes the findings on the project’s approach to preventing negative impacts on the environment among Harvest II grantees;
- **[Section 9 Recommendations:](#)** presents recommendations for Harvest III and future USAID/Cambodia programming.

Annexes include the evaluation scope of work, a summary of the Harvest II strategy, the evaluation plan, information sources and sampling for all elements of the evaluation, the data collection and analysis tools, details of the findings on system change, and brief bios for the evaluation team members.

2 Background and Context of Harvest II

2.1 Context of Cambodia

Cambodia experienced tremendous economic growth from the 1990s through 2019. The economy moved into the lower-middle income category in 2015 after maintaining an average yearly Gross Domestic Product (GDP) growth rate of 7.6% for more than 20 years. The sectors driving growth since 2000 have been garment exports, agriculture, tourism and, more recently, construction and real estate.²

While agriculture averaged 30% of GDP from 2000-2014, by 2019, it had dropped to 22%.³ Nevertheless, 50% of Cambodia’s households are involved in agricultural production, and 37% of the workforce is employed in the sector.⁴ The area under cultivation for horticultural crops was almost 400,000 hectares in 2019, with an annual yield of 3.3M tons.⁵ There are 273 Economic Land Concessions (ELCs) for agriculture covering 12% of the country’s total land area.⁶ The value of Cambodia’s agricultural exports rose from USD 500M in 2014⁷ to USD 1.2M in 2020.⁸

What has not yet happened in Cambodia but must, in order to grow and sustain incomes, is a shift towards value-added agriculture, specifically processing and direct exports. The Royal Government of Cambodia (RGC) Ministry of Agriculture, Forestry and Fisheries (MAFF) introduced an Agriculture Sector Development Strategy for 2019-2025 which aims to increase gross value-added in agriculture by

² Asian Development Bank (2021). [Cambodia agriculture, natural resources, and rural development sector assessment, strategy, and road map.](#)

³ Asian Development Bank (2021). [Cambodia agriculture, natural resources, and rural development sector assessment, strategy, and road map.](#)

⁴ AFID (2022). [Agricultural categories & top products.](#); CIAS (2019). [Final report Cambodia inter-census agriculture survey.](#)

⁵ Grow Asia (2020). [Rapid fruit value chain assessment.](#)

⁶ Global Business Network Program (2020). [Partnership ready Cambodia: agriculture and food processing.](#)

⁷ Asian Development Bank (2021). [Cambodia agriculture, natural resources, and rural development sector assessment, strategy and road map.](#) Page 4.

⁸ Food and Agriculture Organization of the United Nations (2022). [Statistical Yearbook. World Food and Agriculture 2022.](#) Page 214.

4% per year.⁹ This strategy includes mango and cashew as two of ten priority crops.¹⁰ Mango and longan have been granted direct access to the Chinese market through the Cambodia-Chinese Free Trade Agreement.¹¹

Cambodia is highly vulnerable to the impacts of climate change including an increase in precipitation, temperatures and intensity and frequency of climate hazards. The Asian Development Bank projects that, without adaptation to these climate effects, Cambodia will lose 10% of its GDP by 2050.¹² The agriculture sector is particularly vulnerable. For example, in 2021 floods devastated nearly 170,000 hectares of rice and 73,000 hectares of other cash crops.¹³

A number of development partners are supporting horticulture in Cambodia in addition to USAID, often with significant funding, including the Asian Development Bank (ADB), International Fund for Agricultural Development (IFAD), Swiss Agency for Development and Cooperation (SDC), Netherlands Development Organization (SNV), Japan International Cooperation Agency (JICA), German Technical Assistance Agency (GIZ), *Agence Française de Développement* (AFD) and Swiss Church Aid (HEKS/EPER). In addition, the RGC has a number of projects that provide support to the horticulture sector among other sectors, nationally through MAFF, the General Directorate of Agriculture (GDA), the Ministry of Environment (MoE) and the Ministry of Commerce (MoC), and locally through the Provincial Departments of Agriculture, Forestry and Fisheries (PDAFF).

2.1.1 Tree Crops

Harvest II targeted the cashew, mango and longan subsectors. In 2017, the bulk of mangoes, longans and cashews produced in Cambodia were sold fresh through formal or informal channels to Thailand and Vietnam, where they were sorted, graded, processed (if not being sold fresh) and exported. In 2022, this market route continued to account for most of the volume of these crops. In 2017, these tree crops were experiencing a rapid increase in production fueled by high international prices. The price trend started to reverse before the COVID 19 pandemic started. Border disruptions and adverse weather over the last three years depressed demand and reduced yields and quality. At the same time, farmers were affected by increasing input prices. As farmers experienced lower profits or losses, some cut down trees in favor of planting other crops or reduced application of inputs to save money, resulting in a contraction of land area dedicated to these crops. Table I provides estimates of area under cultivation

⁹ World Bank (2020). [Cambodia Economic Update: Restrained Recovery-Special Focus Adapting to Covid-19 in an Uncertain World](#), P. 22.

¹⁰ MAFF (2019). Agricultural Crop Prioritization, General Directorate of Agriculture, Ministry of Agriculture, Forestry, and Fisheries.

¹¹ Khmer Times (2022). [Cambodia exports over 2,600 tons of fresh longan to China in 2 months.](#)

¹² Asian Development Bank (2021). [Cambodia agriculture, natural resources, and rural development sector assessment, strategy, and road map.](#)

¹³ Dahles H. (2021). Cambodia's Uncertain Rebound in 2021. University of Tasmania.

and production volumes for these crops and shows the rapid buildup of area under cultivation for these crops through 2020, followed by a decline in 2022.¹⁴

Table I: Estimated area under cultivation and production volumes for the targeted tree crops 2016-2022

	Cashew	Mango	Longan
2016 total cultivated land	97,614 hectares ¹⁵	5,048 hectares ¹⁶	8,816 hectares (2017) ¹⁷
2016 total production volume	104,435 tons ¹⁸	67,319 tons ¹⁹	26,000 tons (2015 est) ²⁰
2018 total cultivated land	203,808 hectares ²¹	100,092 hectares ²²	7,757 hectares (2019) ²³
2018 total production volume	191,922 tons ²⁴	1,042,469 tons ²⁵	99,326 tons ²⁶
2020 total cultivated land	500,000 hectares (2021) ²⁷	137,950 hectares ²⁸	12,837 hectares (2021) ²⁹
2020 total production volume	250,000 tons ³⁰	1,495,989 tons ³¹	131,498 tons (2021) ³²
2022 total cultivated land ³³	435,733 hectares	121,658 hectares	6,285 hectares
2022 total production volume ³⁴	508,283 tons	1,963,083 tons	79,163 tons

¹⁴ Because the figures in the table come from different sources, there are likely some anomalies. Nevertheless, they illustrate the trends of production.

¹⁵ Grow Asia (2019). [Cashew production, processing and commercialisation in Kampong Thom and Preah Vihear provinces Field Assessment Report](#).

¹⁶ Australasian Agribusiness Perspectives (2021). [Value Chain Analysis of Keo Romeat Mangoes in Cambodia](#).

¹⁷ International Tropical Fruits Network (2017). [Cambodia: Push to increase longan exports](#).

¹⁸ Grow Asia (2019). [Cashew production, processing and commercialisation in Kampong Thom and Preah Vihear provinces Field Assessment Report](#).

¹⁹ Australasian Agribusiness Perspectives (2021). [Value Chain Analysis of Keo Romeat Mangoes in Cambodia](#).

²⁰ USAID Feed the Future (2019) [Cambodia Agriculture Competitive Opportunity Assessment](#).

²¹ Grow Asia (2019). [Cashew production, processing and commercialisation in Kampong Thom and Preah Vihear provinces Field Assessment Report](#).

²² Australasian Agribusiness Perspectives (2021). [Value Chain Analysis of Keo Romeat Mangoes in Cambodia](#).

²³ Grow Asia (2020). [Rapid fruit value chain assessment](#).

²⁴ Grow Asia (2019). [Cashew production, processing and commercialisation in Kampong Thom and Preah Vihear provinces Field Assessment Report](#).

²⁵ Australasian Agribusiness Perspectives (2021). [Value Chain Analysis of Keo Romeat Mangoes in Cambodia](#).

²⁶ Grow Asia (2020). [Rapid fruit value chain assessment](#).

²⁷ Cambodianess (2021). [Cambodia to approve the national policy on cashew nuts by 2022](#).

²⁸ Australasian Agribusiness Perspectives (2021). [Value Chain Analysis of Keo Romeat Mangoes in Cambodia](#).

²⁹ Cambodianess (2023). [Pailin longan boom times loom](#).

³⁰ African Cashew Alliance (2022) [Growth in Cambodian cashew production: what it means to global market, Africa](#).

³¹ Australasian Agribusiness Perspectives (2021). [Value Chain Analysis of Keo Romeat Mangoes in Cambodia](#).

³² Kiripost (2022). [Cambodia given green light to export longan to China](#).

³³ General Directorate of Agriculture Cambodia (2023). Annual Report 2022 and Strategic Plan for 2023. MAFF.

³⁴ General Directorate of Agriculture Cambodia (2023). Annual Report 2022 and Strategic Plan for 2023. MAFF.

There is broad agreement among the RGC and development partner projects that it would be beneficial to Cambodia to increase processing and direct exports. However, there have been a number of formidable barriers that affected progress on this aim from 2017-2022:

- The high-risk profile of these crops has kept investment modest and recent shocks have increased hesitation of farmers and market actors at all levels to invest.
- The cost structure in Cambodia for horticulture value chains continues to be considerably higher than Thailand and Vietnam, particularly related to energy, logistics and inputs.
- Cambodia lacks key expertise for horticulture value chains, such as engineers to adjust and repair processing equipment, and understanding and experience in big export markets.
- Cambodia lacks key products and services necessary for exporting horticulture products, such as laboratory services and packaging.
- Cambodian volumes that meet specifications for certifications, quality, packaging, and logistics are too small for large international buyers such as those from the US.
- The Cambodian government provides considerably less support to horticulture than the governments of Thailand and Vietnam, and the administrative burden associated with export formalities is high.

However, there have been some positive developments. In January 2023, the RGC approved a draft National Policy on Cashew Nuts 2022-2027, reconfirming its intention for Cambodia to become a major cashew producer and supplier in local, regional and global markets. There has also been work on strategic plans to enhance exports of mango and longan. In addition, prices for all three commodities are expected to be higher this year.

2.1.2 Vegetables

There has been a trend over the last decade of substituting locally grown vegetables for imported ones. The GDA estimates that Cambodia has reduced its imports of vegetables from 70% to 40% of domestic consumption. This trend is present in high-end retail outlets and in open markets to a lesser extent, fueled by increasing incomes. There are now more Cambodian farmers growing vegetables year-round and commercially rather than seasonally and/or mostly for subsistence.

These trends were given a significant boost during COVID restrictions because open markets closed, and online delivery services in Cambodia blossomed. People became more health conscious, increasingly preferring local produce which has a reputation for being 'safer' for consumption because of the perception that farmers in Cambodia use less volume of chemical fertilizers and pesticides.

Primarily within middle/upper income, urban market segments, there is significant system change related to competitiveness in the vegetable subsector underway, in particular:

- an increasing number of retail outlets being established to sell local vegetables and established outlets starting or increasing sales of local vegetables,

- new business models for retail sales through online platforms, delivery and neighborhood retail outlets,
- a marked change in farmers’ behaviors with respect to understanding market demand and cooperating in groups and/or with buyers to grow vegetables to meet demand in terms of types of vegetables, specifications and timing,
- increasing standards certification among farmers and firms,
- greater information flows related to market demand and production issues, and
- increased provision and adoption of production technologies (particularly nethouses and drip irrigation) and quality inputs for vegetable production, which increase quality and farmers’ abilities to adapt to climate change and adverse weather.

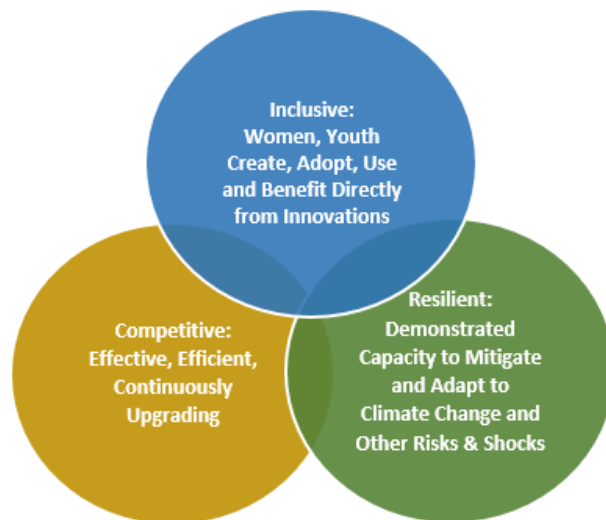
However, there are a number of barriers to progress. Shocks related to climate change and input prices have particularly affected farmers growing in open fields as well as those growing in nethouses to a lesser extent. Cambodia’s high costs for energy, logistics and horticultural inputs makes it uneconomical for farmers to adopt some modern technologies (such as nethouses) and stay cost-competitive with imported vegetables in open markets. Cambodia lacks key services necessary for a wide variety of local vegetables to compete effectively with imports, most importantly logistics and cold chain transport and storage (largely due to the high cost of energy).

2.2 Summary of Harvest II

The purpose of Harvest II was to accelerate the growth of the commercial horticulture sector in four Zone of Influence (ZOI) provinces around the Tonle Sap Lake: Siem Reap, Battambang, Pursat and Kampong Thom. The activity focused on increasing value chain competitiveness and removing obstacles to market access. It was expected that growth would increase sustainable economic opportunities in the horticulture sector. At a system level, Harvest II aimed to make the horticulture market system more competitive, inclusive, and resilient. (See Figure 1).

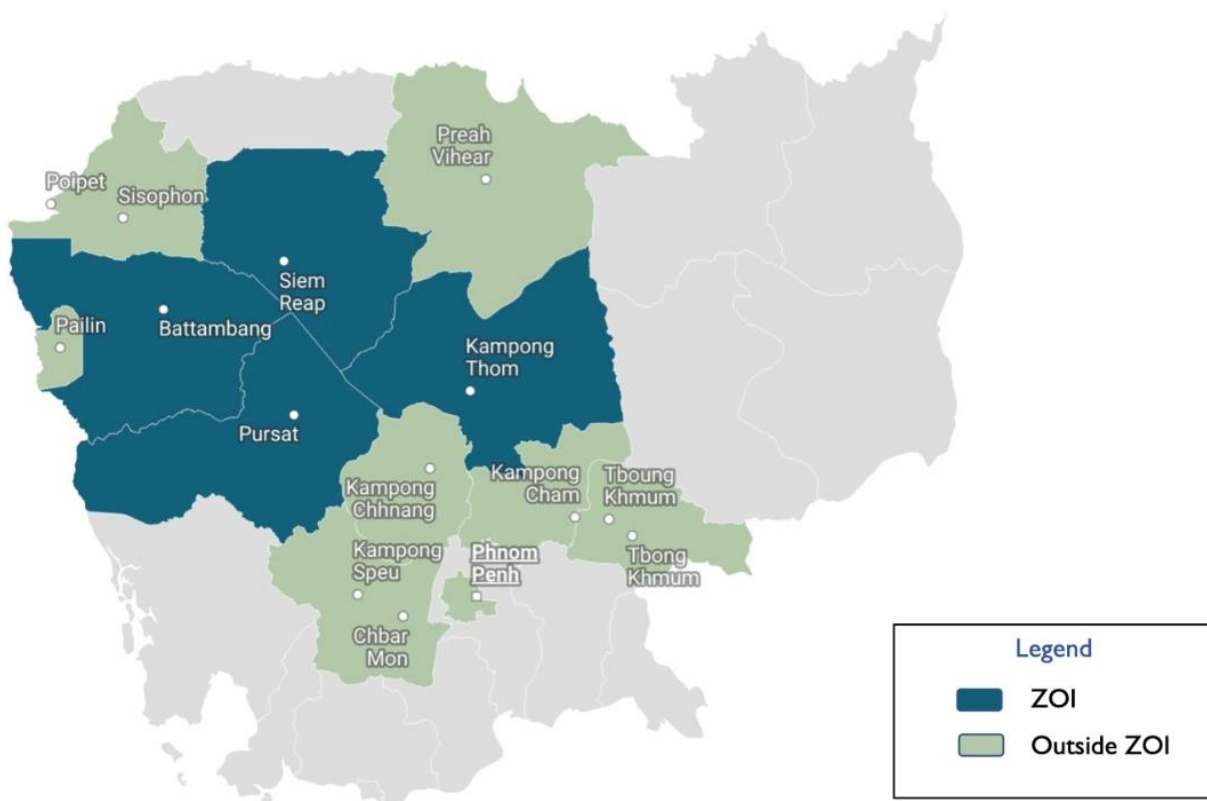
Initially the project focused on a buyer-led approach to developing the sector. During the second year of implementation, the project layered a market system facilitation approach onto the buyer-led approach, allowing the activity to expand work beyond the ZOI and to partner with a greater range of market actors in order to capture additional market opportunities. Figure 2 shows the geographical spread of the buyers with which Harvest II worked and the suppliers they reached. In its second year, the project also focused its efforts on four subsectors: mango, longan, cashew and vegetables. When the COVID-19 pandemic struck, Harvest II

Figure 1: The system level aims of Harvest II



had to adapt both its own operational approaches as well as its strategy, in order to help market actors respond to this significant and long-term shock.

Figure 2: Geographical coverage of Harvest II³⁵



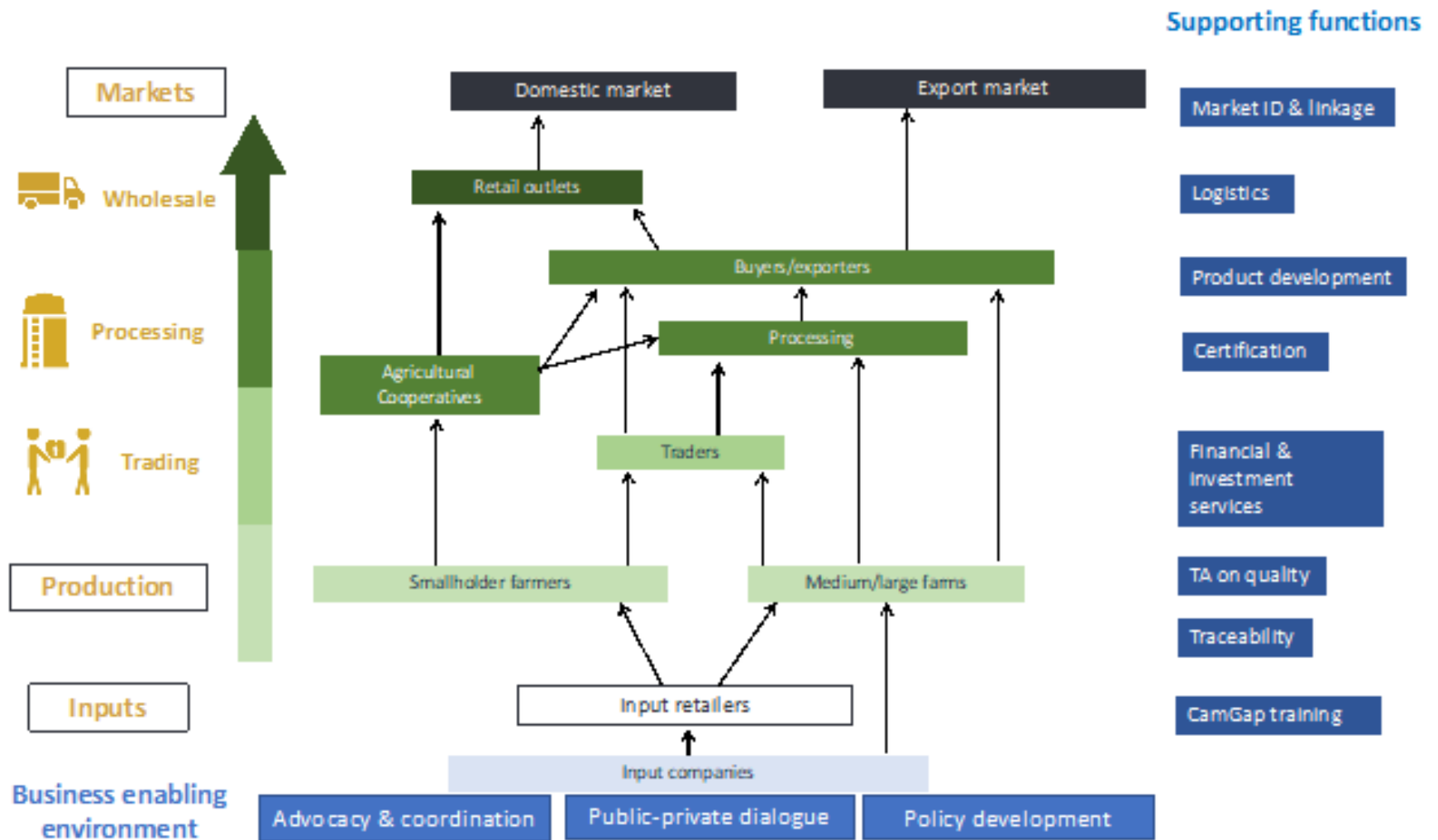
Based on an analysis conducted by USAID/Cambodia during the activity design, Harvest II had three sub-objectives:

- **Improved capacities for market participation**, which focused on improving the financial and business skills of value chain actors, their access to and use of market and climatic information and their financial opportunities.
- **Improved market linkages**, which focused on creating linkages among value chain actors, developing incentives for private sector engagement and investment, and improving value chain coordination.
- **Improved governance and enabling environment**, which focused on strengthening horticulture sector advocacy and coordination platforms, improving the RGC's capacity to address horticulture constraints and encouraging public-private dialogue.

³⁵ Adapted from Abt Associates (2022) Feed the Future Cambodia Harvest II, Final Report 2017-2022.

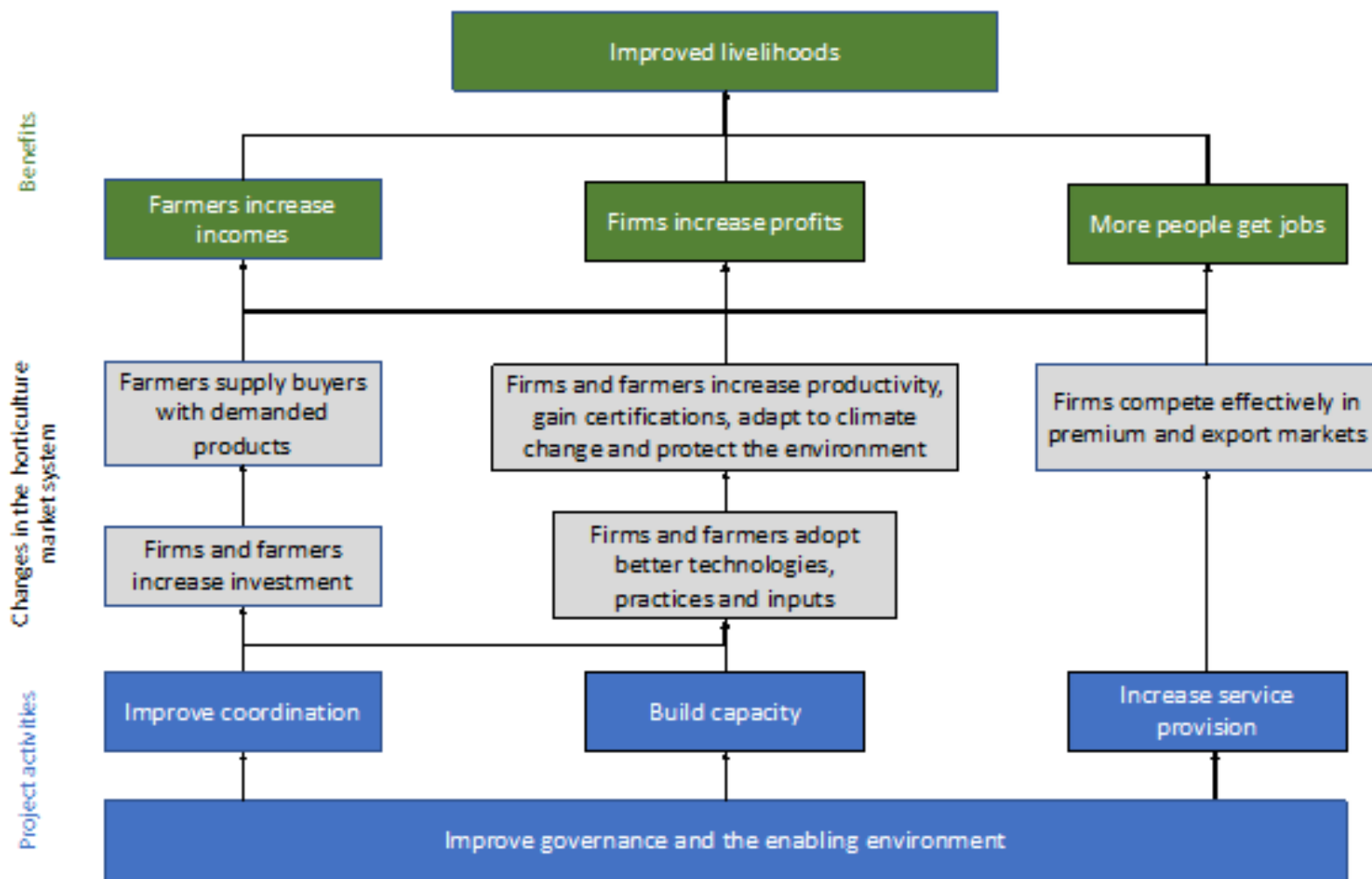
The evaluation team conducted a series of workshops with staff from Harvest II to understand the scope of the project and construct a more detailed theory of change describing the project's strategy. The scope of the project is outlined in Figure 3 using a stylized value chain map for the four targeted subsectors. Harvest II increasingly worked across the value chains from inputs and production through trading and processing to wholesale, retail and export. The project worked with a wide range of market actors. Note that many of these covered several steps in the value chain, such as processing, wholesale, retail and export. Finally, the project worked on a number of supporting services shown on the right side of the diagram. The diagram does not show parts of the value chain that Harvest II did not address, such as subsistence farming and local sales in villages.

Figure 3: Value chain (vegetable, mango, longan, cashew)



The theory of change developed during the workshops is summarized in Figure 4. The work on governance and enabling environment was expected to provide a foundation for the rest of the project activities. Harvest II conducted a series of activities with partner firms to improve coordination, build capacity and increase service provision. Improved coordination was expected to increase firm and farmer investment and build capacity, enabling farmers to supply buyers more regularly with high-quality products that meet market demand in domestic and export markets. Increased capacity was expected to enable firms and farmers to adopt technologies, practices and inputs that increased productivity, enabled them to gain certification for standards required by premium markets and promoted climate adaptation and environmental stewardship. An increase in specialized services, such as packaging and logistics, was expected to enable firms operating in Cambodia to competitively serve premium and export markets directly. These changes in the horticulture system were expected to lead to firms increasing their profits, farmers increasing their incomes and more people getting jobs, resulting in improved livelihoods. Annex C provides a more detailed theory of change diagram in the evaluation plan and Annex B summarizes the project's strategy in each subsector.

Figure 4: Simplified theory of change diagram for Harvest II, developed in retrospect



3 Evaluation Purpose and Questions

The evaluation aimed to explain the extent to which Harvest II achieved its purpose and its potential sustainable outcomes. To inform recommendations for USAID/Cambodia, Harvest III and other stakeholders, the evaluation also aimed to explore factors that supported achievements or failures and capture lessons learned relevant to continuing programming in Cambodia.

The **evaluation focused on four questions** outlined by USAID/Cambodia:

1. What systemic changes has Harvest II made progress on and to what extent have the changes been sustained and scaled?
2. How have the systemic changes benefitted market actors, specifically male and female farmers?
3. How has Harvest II contributed to climate change objectives, aka helping farmers and actors improve resilience to climate change impacts and reduce greenhouse gas emissions? How have the commodities selected contributed to this equation?
4. What has Harvest II done to prevent negative impacts on the environment when providing grants to firms?

4 Evaluation Approach and Methodology

The evaluation was informed by the following key principles: impartiality and independence, user involvement to ensure the usefulness of the evaluation to the intended audiences, methodological pragmatism and efficiency and developmental appropriateness.

The evaluation had three phases:

1. **Desk Review and Evaluation Design:** The evaluation team conducted a desk review of documents from Harvest II. The evaluation team also conducted several workshops with Harvest II team members to understand the project in more detail, including reviewing the boundaries of the market system Harvest II targeted, the project theory of change, specific objectives and activities particularly related to the evaluation questions, the contribution of each subsector to the overall objectives, how the HARVEST II team adapted the project over time, particularly in response to COVID-19, and project stakeholders. The evaluation team used this information to design the evaluation.
2. **Field Work:** The evaluation team employed a range of methods to gather information including:
 - a. reviewing secondary sources on the context of Cambodia, the horticulture sector and key technical areas related to the evaluation questions,
 - b. fourteen key informant interviews with government officials, USAID staff members, other projects and Harvest II consultants,

- c. in-depth interviews with 51 market actors reached by Harvest II and 11 market actors not reached by Harvest II, including buyers, processors, exporters, agricultural cooperatives, input suppliers and service providers;
 - d. seventeen focus group discussions and 8 in-depth interviews with 84 mango, longan and cashew farmers, and
 - e. a survey with 350 vegetable farmers, 300 reached by Harvest II partners directly and 50 who learned from those reached directly.
3. **Analysis and Validation:** The evaluation team conducted both quantitative and qualitative analyses designed to address the four evaluation questions. The qualitative analysis relied on coding in the Dedoose software package. Quantitative analysis was done using Qualtrics and SPSS software. The preparation of a draft report was followed by a workshop with USAID/Cambodia, MSP and Harvest III staff to validate the findings of the evaluation and co-create recommendations. This was followed by a second draft and final report.

Data collection processes were gender-sensitive, purposely seeking out the perspectives of both males and females among farmers, other market actors and other stakeholders. Enumerators employed gender-sensitive techniques to ensure that women were represented in IDIs, FGDs and the survey and that the setting and approach during information gathering encouraged women to participate actively and frankly. Quantitative and qualitative data was disaggregated by sex. Analysis explicitly considered gender as a variable when analyzing adoption of new practices, business models and norms, and changes in the subsectors more broadly. The data collection also captured the perspectives of youth, when possible, specifically where they were involved in horticulture and the activities catalyzed by Harvest II.

To assess the extent to which Harvest II contributed to changes observed in the horticulture sector, the evaluation team employed a theory-based approach, complemented by a strong focus on triangulating participant opinion.³⁶ This started with the analysis of the context of the horticultural sector including reconstructing, as much as possible, the state of the sector in 2017 to provide a baseline against which to assess changes. Across the four evaluation questions, the evaluation team assessed to what extent the outcomes Harvest II aimed to catalyze are evident in the field and the reasons they came, or did not come to fruition. This was complemented by triangulating findings from a bottom-up perspective leading from interventions to outcomes, and a top-down perspective leading from major trends in the four crop subsectors to more specific expected changes.

There were several limitations in the evaluation, which the evaluation team mitigated to the extent possible, including:

- A lack of baseline and systematic monitoring information on the status of the targeted systems and system changes during the project led the evaluation team to reconstruct the baseline situation in 2017 and changes since then using information from the secondary source review and interviews.

³⁶ This approach is consistent with themes in [USAID's Complexity-Aware Monitoring Discussion Note](#) (updated 2021) and [USAID's Guidelines for Monitoring, Evaluating and Learning in MSD](#) (2016).

- The evaluation focused on the four crops Harvest II targeted and did not cover the other crops in which Harvest II worked.
- Due to resource and time constraints, the evaluation aimed to complement the quantitative data provided by Harvest II with a more holistic examination of the benefits that farmers and other market actors experienced, rather than using quantitative longitudinal data and control groups.
- The evaluation team adjusted the plan for the focus group discussions and survey interviews, as farmers in some areas were not reached by partners as expected, or had stopped or shifted their agricultural activities.

Annex C contains the evaluation plan. Annex D presents the evaluation sources and sampling.

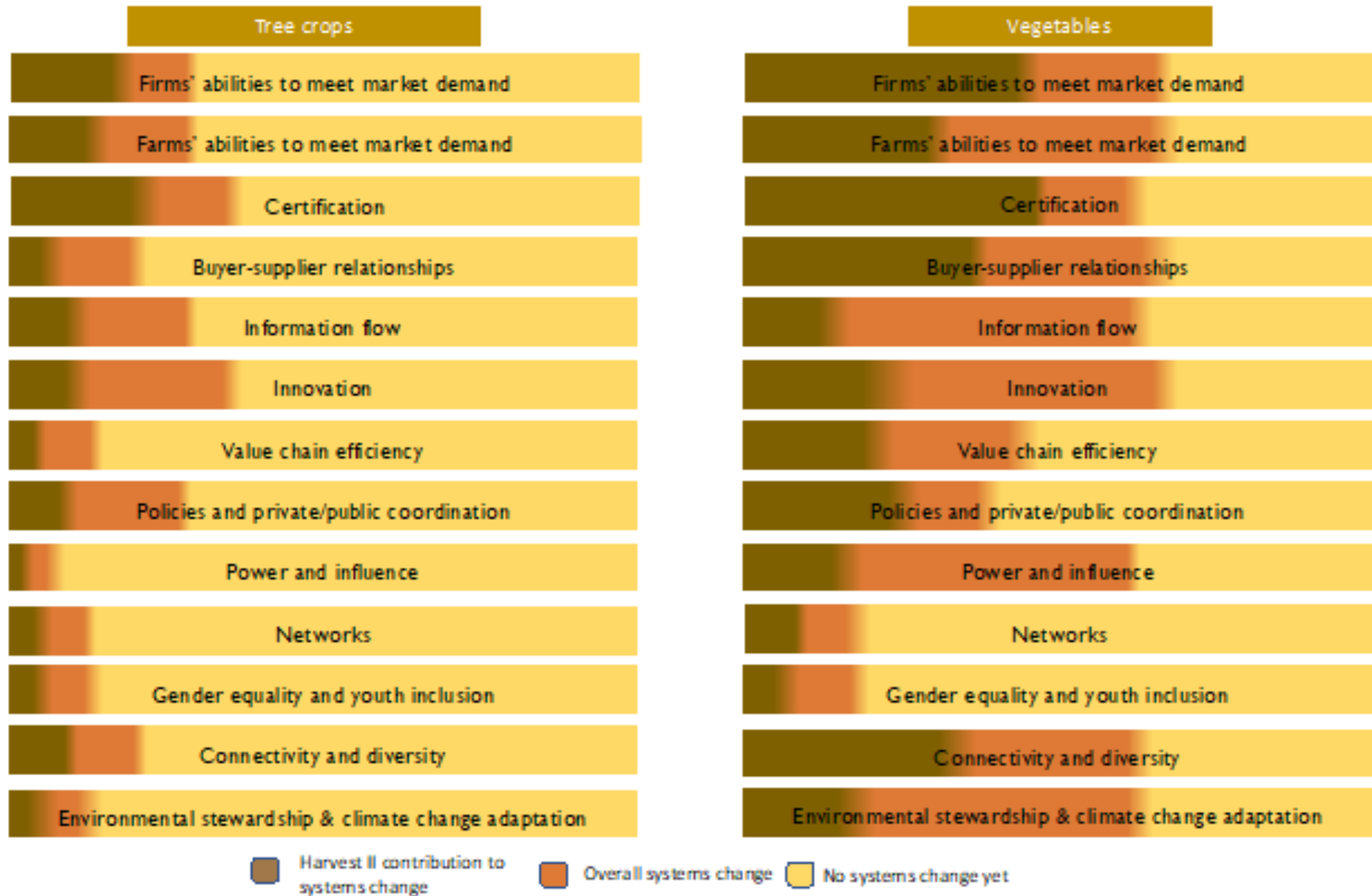
5 Question I: System Changes

This section outlines how Harvest II contributed to system change in tree crops and vegetables with a focus on competitiveness, inclusion and resilience. It discusses findings on the scale, sustainability and depth of improvements and analyzes which Harvest II approaches contributed more or less to the envisioned system changes.

Figure 5 summarizes the findings. It presents dimensions of system change that could lead to enhanced competitiveness, inclusion, and resilience. For each type of change, it visualizes the evaluators' assessment on the extent to which the change is happening overall (**orange**) and Harvest II's contribution to this change process from 2017-2022 (**brown**). Annex F contains a detailed table on dimensions of system change with evidence and analysis from the evaluation.

The tree crops faced a myriad of structural constraints and were strongly affected by shocks during the project period, while Cambodian vegetables faced rising demand and diminished competition due to COVID restrictions. Therefore, as illustrated in Figure 5, there was much more change towards the envisioned system changes overall in vegetables compared to tree crops, which affected the options and leverage points available to Harvest II. The two types of subsectors are often discussed separately below to aid analysis of Harvest II interventions in these differing contexts.

Figure 5: System changes in tree crops and vegetables



5.1 Competitiveness

5.1.1 Tree Crops

In the tree crops subsectors, Harvest II aimed to facilitate a shift toward more domestic processing and sales and more direct exports. For this shift to be achieved, Cambodia needed to improve its competitiveness in these value chains. However, in 2017 Cambodia was starting from a low base and the barriers to progress were significant. Now, examples of potentially successful processors and exporters are beginning to emerge, one key step in driving competitiveness. Furthermore, firms in Cambodia are taking actions to reach new markets, gain certifications, develop new products and better coordinate with suppliers.

The process of system change has been slowed considerably by the shocks over the last three years and volumes in cashew and mango processing still fall far short of absorbing sufficient supply to mitigate boom and bust cycles. For example, it is estimated that only 5% of cashews produced in Cambodia are being processed domestically.³⁷ In longan, increased processing has had some local effect on smoothing demand, in some locations. Harvest II has contributed to the emergence of examples that can help improve competitiveness as well as to laying a foundation for improved competitiveness in the future.

It is important to note that shocks over the last three years including border closures, restrictions on movements, climatic shocks and increases in input costs threatened to bankrupt many firms and farmers. Through a rapid pivot when the COVID-19 pandemic started, Harvest II helped firms to survive and mitigated shocks for farmers to some extent by supporting local demand.

There are several dimensions where Harvest II was a key driver of improved competitiveness that supported steps towards the envisioned system changes required to increase the proportion of tree crops that are processed and sold locally or exported directly.

- **Firms' abilities to meet market demand, including new and premium market opportunities:** Harvest II conducted a number of activities to improve market understanding among firms, including introducing processors and exporters to buyers, direct consulting support and an industry training attended by 23 companies. This support made an important contribution to some firms' abilities to understand and meet market demand in selected export and premium markets.

During its last two years, Harvest II also supported several small processors to develop new products for the domestic market as a way to increase demand when borders were closed or restricted. This product development was also an important step in expanding sales domestically as well as, potentially, exporting. At this stage, most of the supported processors are young and their success in commercializing new products cannot yet be judged. For example, Harvest II supported a small fruit processing company that started in late 2020 to register new products and expand sales

³⁷ Socheata, V. (2023). [Cashew processing sector seeks aid](#). The Phnom Penh Post.

domestically. To date the company has sent test orders to international buyers and is working towards HACCP certification.

The support from Harvest II to help firms meet market demand is reflected in the increase among partner firms' sales to new export and domestic markets. Currently, most companies still lack sufficient understanding, appropriate logistical arrangements and sufficient quantities of products that meet buyer requirements to serve mainstream and larger markets, particularly Western markets, indicating the intensive support required to achieve system change in this dimension. Nevertheless, Harvest II interventions have been instrumental in better positioning some firms to serve new international and domestic markets.

- **Farms' abilities to meet market demand, including new and premium market opportunities:** Harvest II support also helped to increase some farmers' abilities to meet market demand. Harvest II supported buyers to provide technical advice, training and information on product specifications to tree crop farmers. While not all farmers received advice as expected, the model is an important example of buyers, farmers and other market actors working together to meet market demand. Given price volatility as well as climate change and input price shocks, farmers are primarily choosing to adopt only low-cost changes in their practices. Improvements in production technologies are limited. Although shocks are inhibiting more widespread and deeper change, models facilitated by Harvest II can provide examples to others when conditions improve.
- **Certification:** Support to companies and farmers for certification in various standards has helped to increase local sales and shown importers that Cambodia can make progress in meeting their requirements. Certifications include organic certification for firms and farmers, Hazards Analysis and Critical Control Points (HACCP) for firms and agricultural cooperatives, Cambodia Good Agricultural Practices (CamGAP) for farmers, and international certifications such as International Organization for Standardization (ISO) certifications and Good Manufacturing Practice certifications for firms. For example, Harvest II partner firm, CSL Enterprise, received HACCP certification with support from Harvest II, which has helped them to expand their domestic sales for processed longans and cashews, among other products. Cashew farmers who were certified report that collectors compete to purchase their harvest.

See the profile of Misota Food Import Export for an example of a firm that is more competitive and better positioned to meet market demand due to support from Harvest II (Profile 1).

Profile I: Misota Food Import Export

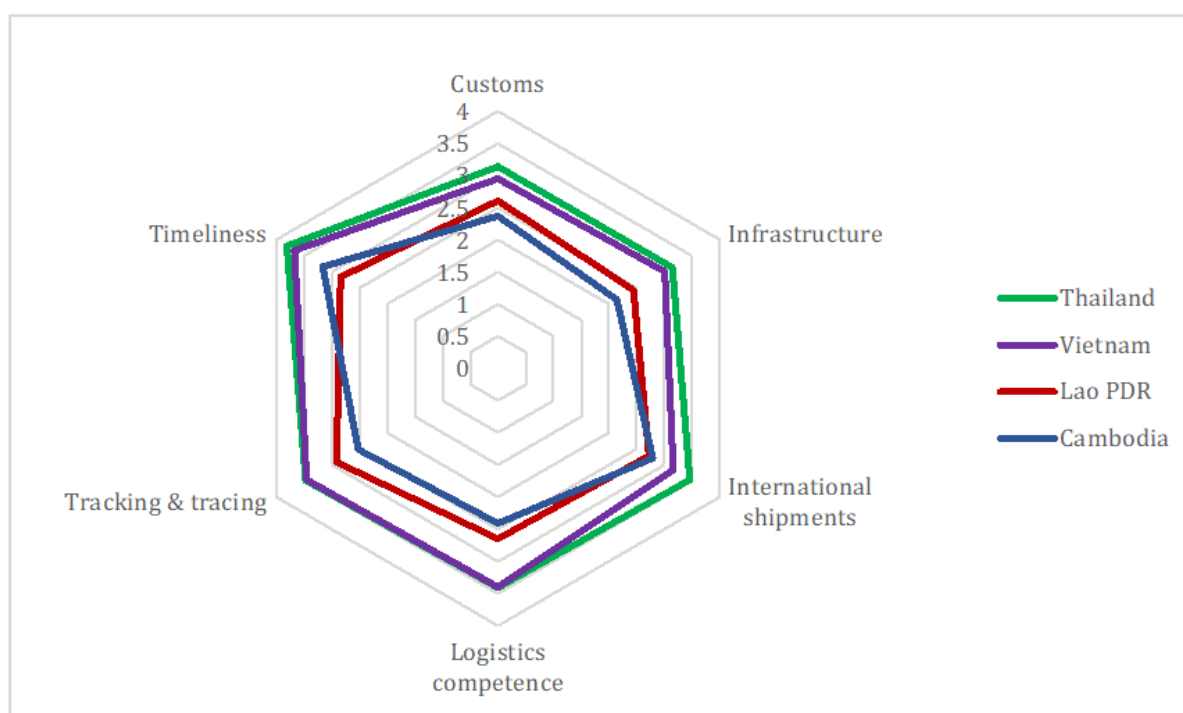
Misota Food started operations in 2020 processing mangoes and pineapples for local and export sales. Even before their partnership with Harvest II, the company worked intensively with supplier farmers to explain product specifications and establish relationships with lead farmers. The company received a grant from Harvest II that enabled them to use the time during the COVID 19 pandemic to increase their capacity to meet market demand. They hired technical consultants to build the capacity of their local staff. They were certified in HACCP, ISO9001 and HALAL, requirements to begin targeting the EU market. They expanded and diversified their production lines, and tested a new product, fruit juice. Although the product test was not successful, Misota is now better positioned to reach new markets. Harvest II introduced them to several overseas buyers and one has ordered a test quantity of products. They are also now selling to two local supermarket chains and to reopening tourist outlets.

There are several dimensions where Harvest II contributed to competitiveness in tree crops as one of a number of projects and government efforts that were influential in fostering improvements.

- **Information flows:** When Harvest II started, firms and farmers had few sources of information beyond collectors for the Thailand and Vietnam markets, and some information from government agencies. Harvest II increased firms' access to information through introductions to international and domestic buyers as well as by facilitating links among value chain firms in Cambodia, which increased information sharing. Particularly during COVID-19 restrictions, Harvest II also supported cooperatives and associations, as well as private firms to use new approaches to providing information to farmers such as Telegram groups and other social media. At the same time, a number of other projects and government agencies have also increased their efforts to provide or increase the flow of information in the tree crop subsectors.
- **Innovation:** Harvest II supported innovations both among value chain actors and service providers. Some of these have been mentioned above. Within service provision, Harvest II worked with several firms that facilitate exports, such as SHE Agrocum and Puzzle Solutions, increasing their interaction with and support to firms in areas such as understanding trading requirements and improving essential services such as packing and storage. Harvest II also worked on innovations in financial services, most notably supply chain financing in partnership with AMK Microfinance Institution. It is too early to assess the success and sustainability of most of the new services, relationships and products started with project support and most have delivered limited impact to date. For example, Harvest II supported Banhji Fintech to test a model of providing accounting software and training to SMEs to produce financial statements with the aim of increasing their access to finance. However, usage was low and the firm has now pivoted to testing invoice financing. Nevertheless, some of the innovations supported by Harvest II may drive system change in the future. There are also innovations emerging without support from Harvest II. For example, Forte Insurance is piloting weather-indexed crop insurance with support from the RGC and the Asia Foundation.
- **Value chain efficiency:** Improving efficiency is essential to competitiveness but has proved challenging to influence because the most critical component, costs, is largely dependent on factors outside of the scope of Harvest II. Energy costs remain higher in Cambodia than neighboring countries and the lack of production of key inputs such as fertilizers and packaging push up costs

substantially. As shown in Figure 6, the efficiency of logistics remains lower in Cambodia compared to Thailand and Vietnam. As discussed above, Harvest II has worked with specialized firms to improve logistics but without improvements to the business enabling environment, it is difficult for this work to catalyze broader changes. Harvest II has contributed to improving the efficiency of transactions among partner value chain actors and to reducing post-harvest waste. Other projects and firms not supported by Harvest II have also contributed to waste reduction.

Figure 6: A comparison of logistics performance in Cambodia, Thailand, Vietnam and Lao PDR³⁸



Source: Logistic Performance Index (2018), World Bank

- Policies and Public/Private Coordination:** Policy work conducted under Harvest II provided necessary technical inputs for Cambodia to comply with international market requirements and trade agreements, and encouraged participation of the private sector in the policy development process. Harvest II also contributed to the development of some notable policies. For example, the recently approved RGC Cashew Policy represents an important step forward in increasing government support for the sector. The strategy research Harvest II conducted as background for the policy clearly lays out the necessary gaps to address in order for Cambodia to become a processing country. There were multiple development partners, private business associations, and government actors involved in the policy formulation and approval; it is not clear whether Harvest II

³⁸ Piseth, S., Y. Monyoudom and H. Tynarath (2021) [Cambodia's Agri-Food Trade: Structure, New Emerging Potentials, Challenges and Impacts of Covid-19](#). USAID Feed the Future.

was a key driver. During the period that the cashew policy was developed, COVID restrictions dampened private sector participation in Harvest II efforts and resulted in consultants sometimes working on policy recommendations in isolation.

Buyer-Supplier Relationships: Harvest II worked with firms to start or strengthen coordination with farmers. In some cases, firms and farmers benefited from improved coordination with commensurate increases in trust. These included improved informal relationships as well as formal agreements such as contract farming or purchase agreements based on farmers meeting agreed specifications and firms paying prices in relation to the prevailing market price for the agreed quality. In other cases, shocks or gaps in Cambodia's supporting services and enabling environment derailed firms' plans to expand or reach new markets, which disrupted relationships with farmers. For example, numerous cases were reported where firms were negotiating an order with a foreign buyer that fell through due to the inability of the firm to meet buyer requirements or logistical challenges, which meant that firms purchased less fruit than they had planned. Farmers interviewed in focus group discussions (FGDs) reported that roughly 60-70% of buyer-supplier relationships did not work out as planned. They reported unrealized expectations such as buyers not providing training as discussed, buyers owing money to agricultural cooperatives or farmers for fruit that had been collected but not paid for, and buyers only purchasing fruit as planned with the farmers for one year or not purchasing fruit at all due to buyers facing reduced demand or cancelled orders. The experiences for cashew farmers were better than the other two crops. None of the tree crop farmers interviewed reported having sustained formal agreements with buyers including both companies and agricultural cooperatives. While many firms reported that farmers made the improvements they asked for, a few firms reported that farmers did not live up to agreements. For example, it was reported that some farmers did not meet quality expectations or product specifications agreed, such as those for pesticide residues, did not take care of their fruit trees properly, did not apply new practices as agreed or required repeated training to do so, had unrealistic price expectations, or sold fruits to other buyers despite agreements. These types of negative experiences increased the skepticism of some farmers and firms towards more formal and multifaceted relationships. It is notable that the extent to which farmers were satisfied with the relationship with their buyer(s) was not different between those reached by Harvest II and those not reached.

Table 2 contrasts the relationships of two Harvest II partner cashew nut buyers. The case of Buyer A shows that Harvest II facilitated some strong and enduring relationships based on increased coordination and mutual benefit. The case of Buyer B shows that shocks can severely disrupt relationships resulting in dissatisfaction for both farmers and buyers. Greater attention to resilience, planning for disruptions and a wider range of interventions to address missing functions would give firm-farmer relationships a greater chance of sustained success.

Table 2: Contrasting buyer-supplier relationships in cashew

Buyer A	Buyer B
<p>Farmers explained that they had developed a good relationship with Buyer A. Although there was no formal contract or agreement between them, Buyer A regularly provided technical advice, purchased all their cashew nuts regardless of size, picked up their cashew nuts from their houses, paid a higher price than other collectors, and provided fast payments. They had continued working with him for several years.</p>	<p>Farmers reported that Buyer B had signed an agreement with their agricultural cooperative for three years (2022-2024). However, Buyer B only purchased for one year. Although the cooperative had paid the farmers on time and in full, the company apparently owed their and other cooperatives money. The cooperative was not purchasing from the farmers anymore. The farmers had appreciated selling to the cooperative as it offered a good price and paid promptly so they hoped the company would pay what they owed and resume the agreement with the cooperative. In the meantime, the farmers were selling to other collectors at variable prices. When interviewed, Buyer B said that they had started their business just before the COVID pandemic and had “lost money since we started” due to the disruptions that the pandemic restrictions caused.</p>

5.1.2 Vegetables

For over a decade, Cambodia has been making progress in substituting locally produced vegetables for those imported, primarily from Thailand and Vietnam. Harvest II made valuable contributions towards this trend, particularly during the pandemic when restrictions and a focus on safe vegetables boosted the trend.

There are a number of dimensions of system change where Harvest II was a key driver of improvements in competitiveness of Cambodian vegetables.

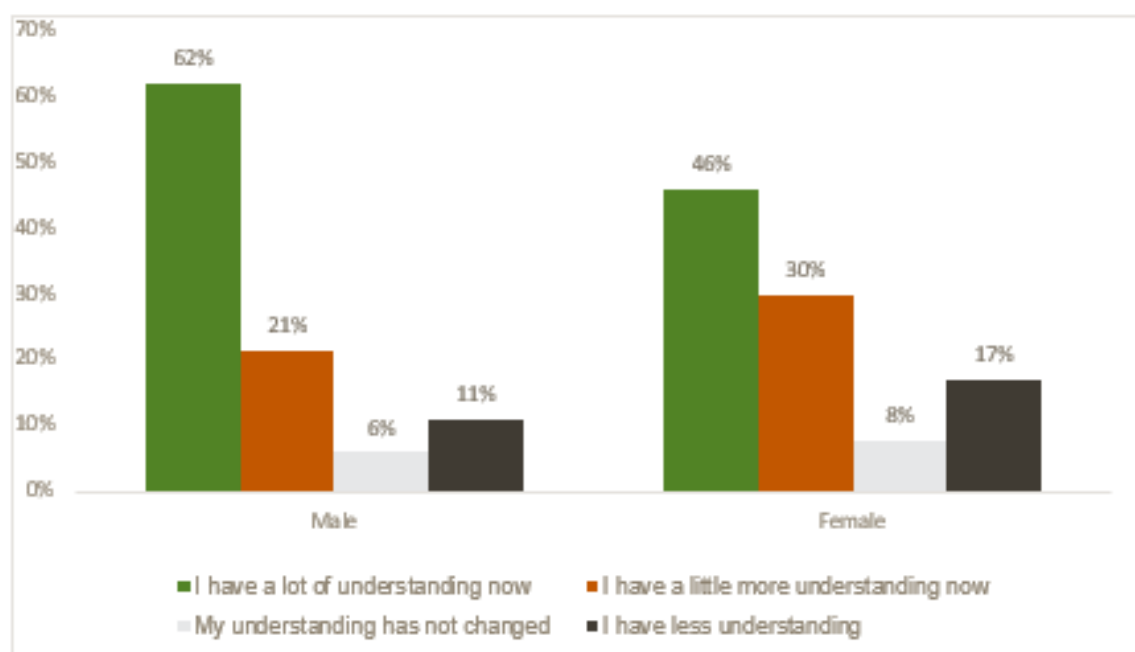
- Firms’ abilities to meet market demand, including new and premium market opportunities:** Firms’ and cooperatives’ understanding of market requirements in urban and premium domestic markets increased markedly over the project period. Harvest II contributed to this trend by connecting firms with new buyers, as well as to each other, and increasing their understanding of the importance of working with farmers to ensure chemical inputs are used judiciously to meet the growing demand for ‘safe’ vegetables. Harvest II also supported firms to meet the requirements of premium buyers. For example, Harvest II partnered with Azaylla Cambodia Co., Ltd., a company that sources ingredients from farmers, processes, packs and distributes them to supermarkets, hotels, restaurants, exporters and processors. The project supported Azaylla to test an IT-based traceability system that complied with the requirements of premium buyers. Finally, Harvest II supported some initial efforts to develop processed vegetable products.
- Certification:** Harvest II support to buyers and farmers for certification in various standards is important to help drive forward efforts to sell in high-end retail outlets in urban areas. The project’s support to partners to provide training to farmers in CamGAP practices was particularly important as this standard is increasingly recognized by urban buyers.

- **Buyer-supplier relationships and value chain management:** Harvest II partner firms and agricultural cooperatives made significant improvements in their support to and coordination with farmers. Many were among the leading buyers providing technical assistance to suppliers, including providing information on demand and crop planning support as well as linkages to better inputs. The improved coordination contributed strongly to the ability of buyers to successfully serve the growing demand for ‘safe’ vegetables among middle and upper income consumers.
- **Value chain efficiency:** Improving efficiency in vegetables has been inhibited by many of the same factors influencing the tree crops subsectors: high costs, particularly for power, and inadequate logistics, particularly cold chain transport and storage. Because vegetables are not exported, these challenges have not had as detrimental an effect on progress as in tree crops. Harvest II has contributed to improved logistics through support to some partners for storage and transport. In addition, Harvest II facilitated connections, which improved the efficiency of transactions along value chains.

There are four dimensions of system change where Harvest II was one of many projects, government efforts and trends contributing to change:

- **Farmers’ abilities to meet market demand including new and premium market opportunities:** Farmers’ understanding of market demand increased dramatically over the project period. Many research respondents commented that previously farmers grew products without understanding demand, but they are increasingly growing crops based on market demand. (See Figure 7 for vegetable farmers’ perspectives on their increase in understanding.)

Figure 7: Vegetable farmers' perception of how their understanding of what people want to buy changed over the last three years including the types of vegetables, the quality and the time of year



Note: Chi-Square test: df= 3, Sig. 0.041

Harvest II contributed to increased understanding and capacity of farmers to meet market demand by supporting partners to provide training and technical support to farmers. Adoption rates for improved practices were high among vegetable farmers (see section 6.1.2 for details). There are a significant number of other projects that also support technical training for vegetable farmers to help them improve quality and yields. Most firms interviewed said they intended to continue the provision of training to farmers at a reduced level after Harvest II support. Given the reliance on donor funding for farmer training, Harvest III could enhance its contribution in this area by working on more sustainable models for the provision of training and technical assistance to farmers.

Harvest II also contributed to the uptake of farm technologies, particularly nethouses and drip irrigation. There are many other projects also promoting these technologies. Harvest II was not cited by its partners as a key driver of the dissemination and adoption of these technologies. It is noteworthy that USAID support prior to Harvest II was cited as a driver of early adoption of farm level technologies, such as drip irrigation and trellis netting through Harvest I and nethouses through the USAID Feed the Future Horticulture Innovation Lab.

- **Information flow:** The links and buyer-supplier relationships that Harvest II facilitated increased the flow of information among market actors, including farmers. Harvest II also supported the development of the AMK Tonlesap app to provide farmers with curated agronomic information that has been scientifically validated. This app is one of several, similar apps and online information sources being developed with donor funds. By the end of the project, the AMK app had relatively limited usage, with 900 registered users in the ZOI. During the COVID-19 pandemic, Harvest II also supported market actors to use social media, such as Facebook messenger and Telegram groups for communication. Social media, including Facebook, Telegram groups, Tiktok and Youtube is increasingly taking off as farmers' preferred information source, with outreach expanding rapidly. Many farmers and firms interviewed stated that they receive a variety of useful information on horticulture through various Telegram groups. Working with market actors to leverage the outreach of social media while integrating more scientifically validated information for farmers would expand the reach of valuable information.
- **Innovation:** The COVID-19 pandemic significantly boosted innovation in the vegetable subsector. The closure of open markets prompted the emergence of new ways to reach customers through online sales and delivery. Innovation has continued with retailers, for example, testing new models for reaching and retaining customers, and firms experimenting with crops new to Cambodia. The evaluation found that there are many sources of innovations, including both firms supported by Harvest II and those not supported, as well as various projects. Harvest II contributed to innovations by working with partners to develop and test new products and practices in the vegetable subsector. For example, Harvest II supported Husk Ventures to pilot biochar products to increase yields in horticulture in an environmentally sustainable way, SPIEN to pilot a traceability system that will increase marketability of vegetables in high end markets, and Banhji FinTech Co. Ltd. to pilot new financial services for horticulture farmers.³⁹

³⁹ Abt Associates (2022) Feed the Future Cambodia Harvest II Final Report 2017-2022.

- **Policies and Private/Public Coordination:** Policy work conducted under Harvest II included the private sector in the process, and the resulting guidelines broadened the scope for private sector activity. Interviewees reported mindset changes on the part of government officials in this regard. Additionally, the work allowed Cambodian government officials to benefit from access to multidisciplinary experts (law, economics, science) and helped the country meet its commitments under the Association of Southeast Asian Nations (ASEAN) trade agreement. One policy, in particular, has legitimized the role of private sector actors in seed distribution.

5.2 Inclusion

5.2.1 Tree Crops

The evaluation found that **power and influence** have remained largely static in tree crops. With the exception of a few, socially-motivated buyers and the farmers with whom they work, the evaluation found that relationships typically remain unstable, buyers do not share power, and farmers have limited voice in transactions and value chains. As an example of comments heard from farmers in all three tree crop subsectors about their current situation, one longan farmer noted that they never know if or when a collector will show up, which caused a lot of losses both of fruits and money paid to hire pickers.

Harvest II worked with socially motivated buyers who shared power with farmers in more stable relationships, supporting several firms to become models of ethical and effective relationships with their suppliers. These firms have not yet influenced others, as their changes are recent and current market conditions put smallholder tree crop farmers at a disadvantage in Cambodia. In both some buyer-supplier relationships facilitated by Harvest II and those that developed without support, the significant number of shocks over the last few years have often damaged relationships, sometimes with both buyers and farmers feeling that the others have broken agreements or not honored the relationships. For example, one group of cashew farmers noted that their agricultural cooperative, the trading partner of a Harvest II partner firm, had purchased cashew nuts the previous year but this year they were not buying any, leaving them “speechless.” One company trading in organic cashews said that farmers’ expectations about the price premium for organic cashews was unrealistic, which led farmers to stop organic production or to “try to cheat.”

Some Harvest II partners have expanded their **network** of smallholder farmer suppliers. See the profile of HCST for an example (Profile 2). Given the challenges of reaching new international markets, some companies supported by Harvest II to expand their supplier base purchase only from a subset of suppliers each year based on their needs. One notable Harvest II partner firm finds other buyers if she is not able to purchase all of her suppliers’ harvest, but others do not inform suppliers of their intention to purchase or not. Some buyers are establishing or expanding their own tree crop farms to better control supply and quality. It is recommended that Harvest III customize the tree crop strategy more closely to this subsector context, for example by expanding approaches that have proven successful in addressing power imbalances, such as farmer certification and farmer collective action, and by prioritizing interventions to address gaps in specialized services and the enabling environment to support direct exports.

Profile 2: Handcrafted Cashew Nut Stung Treng

Handcrafted Cashew Nut Stung Treng (HCST) is a cashew processing facility started by a female owner/manager in 2021. HCST is a Harvest II partner that has also received support from other projects. HCST exports 90% of their volume, while 10% is sold locally to premium retailers, particularly for the tourist market. HCST increased their supplier base from 60 to 100 farmers. The owner reports that some farmers were thinking of cutting down their cashew trees before she worked with them, but they are now happy to continue growing cashews. The company has also doubled their staff size from 10 to 20 employees since they opened. With support from Harvest II, HCST trained farmers on CamGAP, expanded their factory and developed new processed cashew products. The owner now provides information to others on the cashew subsector.

5.2.2 Vegetables

In vegetables, particularly during COVID restrictions, there was often more demand than supply. This imbalance gave farmers more **power and influence**. Harvest II, other projects, agricultural cooperatives and farmers themselves capitalized on this opportunity. Farmers work together more than they used to and increasingly negotiate with buyers as a group. Agricultural cooperatives and other intermediaries are negotiating more successfully with retail outlets. Increasingly productive and stable relationships are emerging and, within the premium markets, becoming widespread. Harvest II has made a valuable contribution in this respect. See the profile of Harvest II partner, Tasey Samaki Agricultural Cooperative, for an example (Profile 3).

Profile 3: Tasey Samaki Agricultural Cooperative

Tasey Samaki Agricultural Cooperative (TSAC) has 170 household members, 83 of those grow vegetables year-round while the rest grow seasonally. TSAC buys and sells members' vegetables as well as providing them with a crop planning service. TSAC also provides related services to farmers such as technical support to start growing vegetables and nethouse building services. Support from Harvest II enabled TSAC to purchase office equipment, build more nethouses, provide extension services to encourage more adoption of nethouses, purchase a truck to transport vegetables, increase links with markets and help some farmers to get CamGAP certification. TSAC leadership reports that they are now more confident to approach buyers, such as big supermarkets. They note that previously agreements were one sided, but now "we can negotiate on equal terms with supermarkets." For example, TSAC now explains to buyers that they cannot always demand the same size, shape and type of vegetables because farmers are subject to seasonality.

The evaluation found that commercial **networks** in vegetables currently include many smallholder farmers but are not expanding appreciably to more smallholder farmers, mainly because it is much more common for existing smallholder vegetable producers to expand rather than new producers starting to grow vegetables. There is also a sentiment among a number of buyers that interacting with smallholder farmers is too challenging. As a result, some firms are establishing or expanding their own farms rather than starting relationships with new smallholder farmers. To manage the risk that this might reduce smallholder farmers' participation in value chains serving middle and upper income consumers in the future, it will be useful for Harvest III and USAID to understand this trend and outline how existing smallholder vegetable farmers can further build their competitive advantage in order to play a continuing central role in serving growing vegetable markets. It will also be useful to consider how to build incentives for firms to work with new smallholder vegetable producers. For example, new vegetable

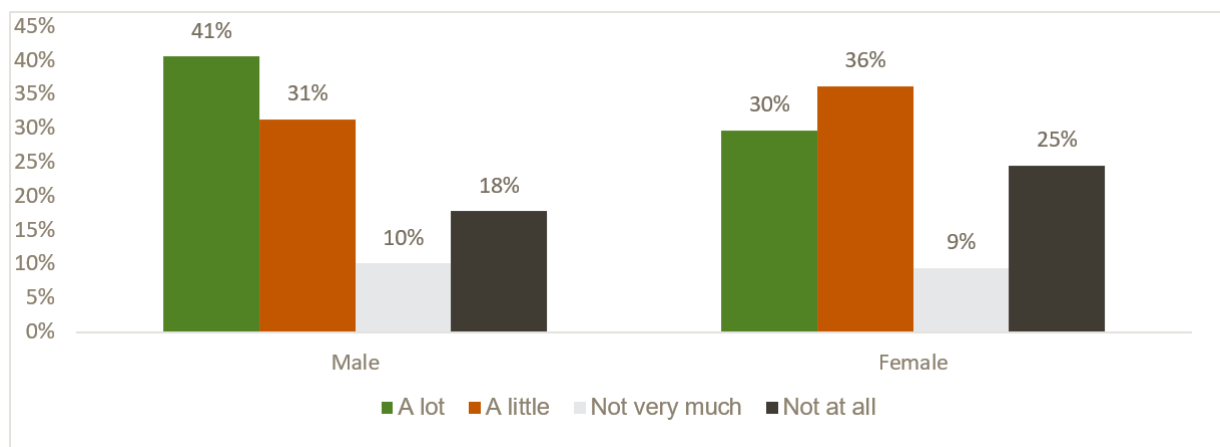
producers may be able to grow vegetables that are not available from current smallholder vegetable suppliers in their areas.

5.2.3 Inclusion of Women and Youth Across Subsectors

The evaluation findings indicate that women’s roles, access to opportunities, decision-making power and leadership have remained mostly the same in the four targeted subsectors. Before Harvest II started, women were already playing significant roles in horticulture, particularly in vegetables. It is notable that women have maintained their roles in the subsectors when farm operations have expanded, and revenues increased. Harvest II specifically sought out promising women-owned and managed firms. The project’s support of these firms contributed to them becoming positive examples of women’s leadership and enabled those specific women to get access to more opportunities.

There is no evidence yet that Harvest II catalyzed changes in women’s access to productive resources, opportunities or leadership on a wider scale. There are some negative aspects of inclusion that persist both among those firms, agricultural cooperatives and farms that Harvest II has reached and those they have not. Across all subsectors, female farmers are less likely to be members of an agricultural cooperative than male farmers, and when women are members, they are less likely to be in leadership positions. For example, one female cashew farmer noted that in her village, “women are not members of the agricultural cooperative.” Among vegetable farmers, 31% of male farmers interviewed are members in a cooperative, while 24% of female farmers interviewed are members. There is also some evidence that women’s involvement in vegetable production and sales has increased somewhat, while their decision-making has remained the same. In addition, female vegetable producers may feel that they have less influence on transactions with their buyers and on the vegetable value chain in their area than male vegetable producers. Figure 8 compares female and male farmers’ perceptions of their influence on transactions with buyers, although the differences between male and female farmers shown in the figure are not statistically significant. Understanding the structural constraints to gender inclusion and integrating efforts to address them in the project strategy and interventions can help Harvest III expand impacts on gender equity.

Figure 8: A comparison of the extent to which female and male farmers feel they can influence transactions with buyers



Note: Chi-Square test: df= 3, Sig. 0.173

Youth do not play a big role in most aspects of the subsectors Harvest II targeted. However, a few youths are interested in starting businesses in processing or other innovative areas such as fintech. Harvest II has played an important role in supporting these youth businesses, enabling these particular young people to play a more prominent role in the subsectors while also contributing to competitiveness. The evaluation did not find that Harvest II has influenced youth involvement in the subsectors more broadly yet.

5.3 Resilience

The last three years have been a significant test of resilience in all four subsectors. While COVID 19 was a major factor, weather variability linked to climate change and input price shocks, as well as price variability have been damaging as well. These shocks have highlighted significant weaknesses in the resilience of horticultural value chains in Cambodia, which must be addressed if the sector is to improve competitiveness and sustainably increase benefits for farmers.

There have been positive developments at the firm level. **Connectivity** among firms is increasing, with Harvest II networking interventions significantly contributing to new relationships and increased interaction. For example, Harvest II linked two partner companies in mango who are now cooperating to address barriers to exporting mangoes to Western markets, particularly compliance with pesticide residue standards. In both vegetables and tree crops, Harvest II made an important contribution to increased linkages among value chain actors, such as among input suppliers, farmers and agricultural cooperatives, buyers, retailers and, in some cases, service providers.

Diversity has been shown to increase resilience and there are examples of new products, new services, new business models and reaching new markets. At this stage, many of these are small scale and it is too soon to judge long-term commercial viability. For example, a significant proportion of the sales to new export markets by the end of Harvest II were test sales rather than commercial volumes. Nevertheless, Harvest II has contributed to a greater variety of products, services and markets in Cambodian horticulture.

Conservation of natural resources, environmental stewardship and adaptation to climate change are also key to resilience. Awareness of these issues is surprisingly high and increasing among both farmers and firms. Concerted efforts by government agencies, particularly MAFF and PDAFFs, and many projects have raised farmers' awareness of the dangers of soil degradation and other adverse environmental effects. Cambodia has a reputation for using less chemical fertilizers and pesticides, thus growing horticultural produce that is safer than neighboring countries, which fuels domestic demand for local vegetables and demand for tree crops in some export markets.

Harvest II, other projects, government agencies, and private firms have provided or promoted an increasing number of solutions to help farmers conserve natural resources and adapt to climate change in the vegetable subsector, including climate resilient seeds, nethouses, drip irrigation, and natural fertilizers and pesticides. For farmers serving premium markets, these are economically viable options. There are fewer and often less attractive options for the tree fruit subsectors. The tree crop farmers

interviewed felt they had few, if any, options to deal with the variable weather that has often decimated their crops over the last few years.

5.4 Analysis

5.4.1 Sustainability, Scale and Depth of Changes

Scale: Harvest II has interacted with a high proportion of the firms operating in Cambodia within the targeted tree crop subsectors, with the exception of Chinese firms. However, the bulk of production does not flow through firms operating in Cambodia but instead is sold to collectors who sell to firms in Thailand and Vietnam. Nevertheless, the examples of successful or promising firms to which Harvest II contributed will be important to drive wider change in the future.

While a few of the Harvest II partner firms have attracted attention, there is no evidence yet of Harvest II partner firms influencing the behaviors of other firms. This is likely because:

1. changes within Harvest II partners are relatively recent,
2. new products and business models have not been proven profitable or scalable yet, and
3. risks, averse macroeconomic factors and significant shocks in the last few years are causing hesitation among all market actors and investors.

In vegetables, Harvest II has joined other projects and efforts to capitalize on trends supporting increasing substitution of local vegetables for imported ones in domestic markets. These efforts have made a significant impact in the growing premium markets for vegetables fueled by increasing incomes in Cambodia. To further expand these markets, it will be helpful to also create business models with lower costs appropriate for mainstream markets.

Sustainability: Some Harvest II supported business models are likely to be fully sustainable, particularly more mature examples with strong business cases. For example, investments by Santana Agro Products Co., Ltd, supported by Harvest, have helped the company to expand cashew nut processing for export. The majority of value chain firms supported by Harvest II are sustaining at least some of the changes that they made, such as providing information to farmers and reaching out to new markets.

There were challenges to the sustainability of improvements among some market actors, for example:

- **New relationships:** There was a rapid breakdown in a number of facilitated buyer-supplier relationships in the tree crops subsectors, as referenced above.
- **Farmer practices:** Farmers only adopted some practice changes for one year due to high cost or difficulty to sustain adoption without further support, particularly in the face of shocks. For example, most tree crop farmers said that the technical practices they learned were effective in increasing yields and quality, but some said they could not sustain the practices due to a lack of capital. A vegetable farmer noted that she had tried a new, environmentally friendly fertilizer from a Harvest II partner firm, because it was initially provided for free from a local NGO with which the Harvest II partner firm worked. Although she liked the product, she decided not to use it again because she had to order it over Telegram and it was too expensive.

- **Grantee practices:** Some grantees are struggling to sustain changes. For example, a Harvest II partner vegetable buyer opened retail outlets in several open markets but closed them because they were not price competitive with the vegetables available in the markets.
- **Contracted service providers:** The service providers contracted by Harvest II, as opposed to those with partnership agreements, will not continue to provide services without payment from projects. For example, a consultant that Harvest II contracted to provide training to SMEs does not anticipate serving SMEs commercially in the future.

A greater focus on resilience and risk management would address some of these challenges. In addition, it would be useful to more fully understand farmers' constraints to adopting new practices and build more measures into value chains to address these. Finally, further developing the process for assessing the business viability of new relationships and business models in advance will increase the potential for sustainability.

Depth: Within vegetables, firms and farmers typically adopted multiple changes that enabled them to take advantage of market trends, with support from Harvest II and, in some cases, others. Vegetable farmers reached directly by Harvest II partners on average adopted 4.5 new practices out of an average of 6.2 on which they received information, for an adoption rate of 73%. Farmers felt they benefited from almost all practices they adopted. A number of supported vegetable firms were making quite far-reaching changes within their businesses, for example providing a range of new services to suppliers, reaching new markets and considering new business lines, particularly retailing. Within tree crops (with the exception of organic cashews), the depth of change among firms and farmers was typically more modest. For example, farmers were often choosing only low-cost changes in their practices.

5.4.2 Conclusions

The macroeconomic and business enabling environment barriers to increasing direct exports in tree crops and competing with neighboring countries in all subsectors are substantial. They include, for example, the price of energy, the cost of domestic and international logistics, the efficiency and transparency of export procedures such as inspections and phytosanitary certificates, missing specialized services such as laboratory services and workforce skill gaps. Several of these, such as the price of energy and workforce skill gaps, were beyond the scope of the project. Harvest II worked in the key areas within their scope that are required to drive improved competitiveness in Cambodian cashew, mango, longan, and vegetables. While most of the tree crops continue to be sold to Vietnam and Thailand with no value add, there are valuable examples of change to which Harvest II was a key contributor. A number of expected investments in tree crops for export did not eventuate, largely because of macroeconomic and business enabling environment barriers as well as climatic and market shocks. It will be difficult to make significant progress unless some of these improve. The findings of the evaluation on missing services and workforce improvements needed to increase the competitiveness of Cambodian horticulture largely concur with those in the Harvest II final report.

In the tree crops subsectors, more intensive interventions where Harvest II and often other projects, provided multiple forms of support to individual firms or cooperatives, were more impactful and contributed more to system change than extensive interventions. Training or other extensive

interventions alone produced limited impacts and, in some cases, led to unintended impacts both on the company and on wider system change by encouraging firms to make investments without the capacity and connections to enable them to succeed. By contrast, some intensive interventions with a single company or agricultural cooperative achieved significant impacts. These intensive interventions were typically grants covering multiple activities or a grant plus other types of support such as training and networking assistance. Given the multiple, significant barriers in tree crops, the intensive support enabled firms to make substantial improvements in their business models and operations, attracting attention and becoming models that other market actors are interested in copying. See Table 3 for a comparison of Chey Sambo Cashew Nut Processing Handcraft which received intensive support from Harvest II and others, with another small cashew processing company that received only extensive support. These examples illustrate how intensive interventions can enable a firm to succeed in a difficult environment where extensive interventions cannot. In vegetables, both intensive and extensive interventions were impactful as firms faced fewer barriers and thus could more easily address some constraints without external support.

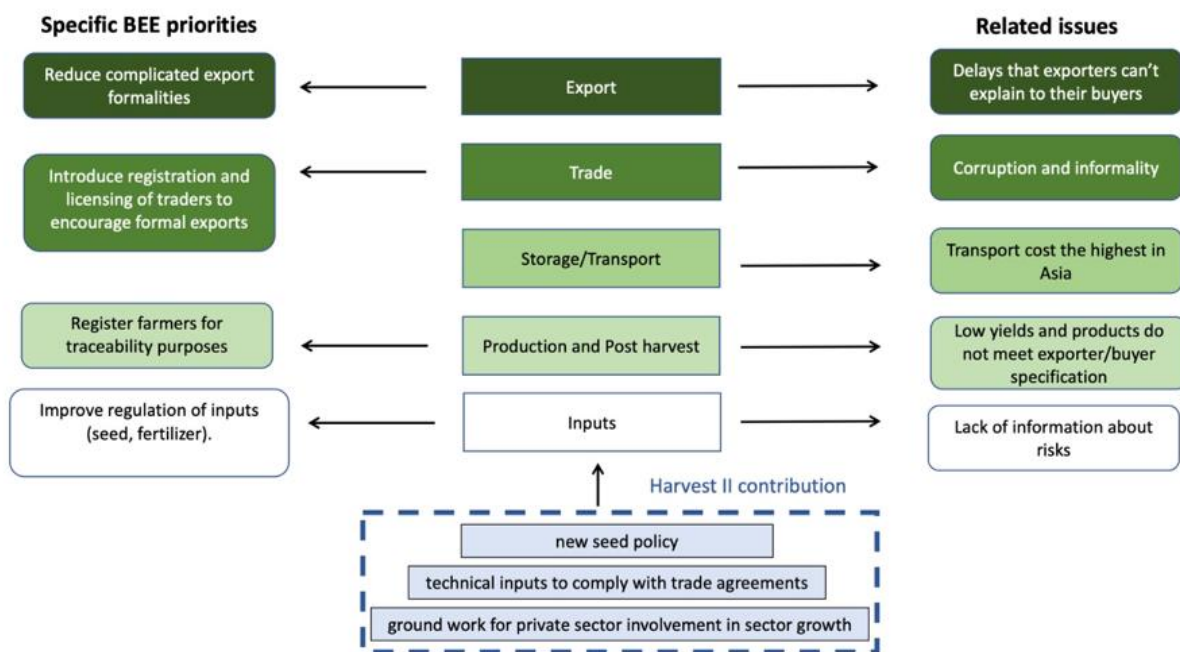
Harvest II's flexibility with funding companies allowed the project to support early business models. However, delays in funding decisions and contracting jeopardized the business innovations the grants were planned to support in a number of cases.

Table 3: Comparison of Chey Sambo Cashew Nut Processing Handcraft (CSC) with another small cashew processing company supported by HARVEST II

Company	Chey Sambo Cashew Nut Processing Handcraft (CSC)	Company B
Profile	Owner In Laihout started a small cashew processing business in 2019 purchasing from 13 other households.	The company is a family-owned cashew processing business purchasing cashews nuts from local suppliers.
Support received	The owner started the business after participating in a training course on cashew processing sponsored by Harvest II. The project also supported her to develop her relationship with her suppliers. She received additional training supported by Harvest II on production and harvesting techniques, as well as business and financial management. The financial management training helped her to get an initial loan to build an additional building for processing. The publicity around her involvement with Harvest II caught the attention of a Japanese company, Top Planning Japan, whose Cambodia representative has a passion for supporting the Cambodian cashew sector. With support from JICA, Top Planning Japan built a new factory for CSC with modern facilities and equipment to tightly control quality. The company also supported CSC to gain HACCP certification. At the same time, CSC received an investment accelerator grant from Harvest II, which supported the expansion of the business. The owner also participated in a training course by UNIDO on digitizing her business.	The owner participated in a training course on cashew processing sponsored by Harvest II. She then got a small loan from AMK facilitated by Harvest II to purchase a small processing machine and another NGO linked her to a buyer in Korea.
Business performance changes	The company currently has 115 staff of which 12 are permanent and the rest seasonal. They now source from approximately 1,000 households in two provinces through 8 agricultural cooperatives, providing technical support and paying slightly above market prices. From operating with basic machinery in a small building, they now operate one of the most modern cashew processing facilities in Cambodia. Seventy percent of the products are exported to Japan totaling 1,500 tons this year. The rest is sold locally. CSC and Top Planning Japan are now one of the most often referenced cashew processing operations and provide information to others.	Based on information and inspiration from the training, the owner asked her relative to take a personal loan to enable her to expand her processing facility and purchase additional new equipment. She promised her neighbors that she would purchase their cashews to process for her Korean buyer. However, at the time of the interview, the facilities and new production line were not complete, while cashew harvesting had already started. As she was not able to purchase her neighbors' cashew nuts, they were selling to others, while her buyer was demanding that she send the promised test order. There was a significant danger that she would miss the whole season, jeopardizing her ability to pay back the loan. The owner mentioned that several neighbors were waiting to see how her expansion went before deciding whether to invest more in cashews.

Support to improving the business enabling environment was an important area of Harvest II work. There are five levels of reform: policy, legal, regulatory, organization and procedure.⁴⁰ Harvest II focused on the highest level of policy work with some work on regulations in order to respond to specific government requests for assistance. Harvest II work contributed to changing mindsets about the role of the public versus private sector (for example, accepting that seeds can be provided by the private sector). In addition, the work allowed Cambodian government officials to benefit from access to multidisciplinary experts (law, economics, science). In fact, technical staff from ministries have begun implementing some policies, such as phytosanitary standards, even though they are not yet formally approved.⁴¹ While policy work is generally considered to be a powerful lever for systems change, the full effect of this work cannot be determined until policies pass the final stages of approval and implementation is rolled out full scale. While partial implementation prior to approval may be a good thing technically, it risks creating confusion and contributing to already existing challenges regarding transparency.

Figure 9: Summary of BEE issues and priorities



In addition to inadequate policies, there are other business enabling environment challenges at every level of the value chain in all four subsectors, which significantly affect the progress of system change (see Figure 9). No explicit work has been done on the lower levels (organizational capacity and

⁴⁰ Donor Committee for Enterprise Development

⁴¹ Involvement in testing the implementation of new guidelines could result in greater transparency than waiting for slow national approvals, while government officials decide on their own what to implement and what not to implement, without any formally published rules, leaving farms and firms in a gray zone of non-transparency.

procedures), though arguably these levels most frequently touch the day-to-day business of farms and firms, especially exporters (e.g. waiting in line in Phnom Penh for phytosanitary certificates, inspection delays, highest transport costs across the region), and are increasing the challenges for firms and farms in making the changes promoted by other components of the project.

Some interviewees highlighted the policy work as an activity that could easily be leveraged to maximize inclusion (i.e., youth, women, vulnerable populations) but stated that this was not always done. In some cases, COVID 19 restrictions interfered with the ability to organize broad stakeholder consultations.

The project focus has been primarily on sector growth and that is reflected in the goal of the project as stated in the evaluation scope of work. It is not clear to what extent inclusion was as important a goal as increased competitiveness and sector growth. Harvest II's vision for the sector in relation to inclusion not only of women and youth, but also small enterprises and smallholder farmers is unclear, and, therefore, the project strategy does not have a strong inclusion focus. While Harvest II focused on addressing structural barriers to competitiveness, the focus related to inclusion was more on facilitating positive examples.

Horticulture, including the subsectors that Harvest II targeted, is risky and getting more so due to climate change and increasing global volatility, which affects inputs costs, product prices and international logistics. Behavior changes were more likely to be sustained and benefits more likely to be realized when Harvest II addressed the specific risk factors for farmers and firms. Increased focus on resilience will be a key factor in catalyzing further positive system change.

6 Question 2: Benefits for Farmers and Other Market Actors

This section describes the benefits for male and female farmers, and other value chain actors that resulted from the steps toward system changes to which Harvest II contributed. The underlying reasons for the benefits are then analyzed, followed by conclusions. Since the benefits in tree crops and vegetables differed substantially, these subsectors are treated separately below.

6.1 Benefits for Male and Female Farmers

6.1.1 Tree crops

On farm benefits: Some tree crop farmers cited a range of benefits they have gained from their involvement with Harvest II partners, particularly from training. These focused mostly on production aspects such as cost savings from making natural fertilizers and increased yields and quality from technical advice and improved fertilizer practices. A few farmers cited benefits from improved financial management. Some farmers noted that agricultural cooperatives typically paid higher prices. There was

no noticeable difference between male and female farmers with respect to their perceptions of on farm benefits.⁴²

Income: Due to shocks and price volatility, the majority of tree crop farmers interviewed, both male and female farmers, did not feel that they have earned more income, earned income more regularly or earned income for a greater part of the year over the past several years. For many farmers, income continues to follow boom and bust cycles and efforts by Harvest II and others to stabilize prices by expanding local processing has not yet had a significant impact. For example, cashew farmers interviewed said that the price of fertilizer and pesticides has increased 30% over the last 3 years, pest infestations were worse than usual in 2022 and unexpected rain had impacted yields over the last 5 years. As a result of low prices and low yields caused by successive shocks, some farmers, particularly in the areas hardest hit by climatic shocks, have cut down trees or chosen not to invest in their tree crops to avoid losses. While these farmers have avoided losses, they will also not be able to take advantage of price rises in the future. In addition, some farmers have not implemented or not sustained practice improvements due to variability in yield, price, and profit in the past few years. Differences between male and female farmers in the application of training are noted below. These findings show that progress in production practices can be undermined by a lack of resilience to shocks.

It is important to note that Harvest II contributed to mitigating some of the adverse effects of shocks on incomes. Practice changes that some farmers made in response to training and technical advice provided by Harvest II partners contributed to increased yields and quality. In selected locations, an increase in local processing supported by Harvest II has positively influenced prices and price stability. Examples can be found in all three tree crop subsectors. The profile of Pechenda Fruit Production Company (Profile 5) below illustrates this positive influence. These cases indicate that the focus Harvest II put on sustaining and building local demand in tree crops was important; expansion of this effort will be valuable.

Those farmers who received food safety training and CamGAP or organic certifications fared better than others, selling their products at higher and more stable prices than others. For example, the Cambodia Food Manufacturer Association (CFMA), which Harvest II supported in product registration, helped member companies with adequate food safety certifications covering farmers to sell to local supermarkets and mini marts.⁴³ CSC offered a 20% premium price to cashew farmers with an organic certification because of the price premium for organic cashews in the Japanese market, which CSC reached through its partner, Top Planning Japan. In focus group discussions, all tree crop farmers who applied their CamGAP training felt they benefited from it. For example, a longan farmer said, “*the trees grow well, and the fruits meet standard requirements and are sold at higher prices.*”

There were distinct gender disparities in the application of training. Female farmers interviewed tended to be more cost conscious than male farmers, avoiding expensive investments or practices, which saved them money in the short term but excluded them from benefiting from investments such as improved

⁴² Note that not all farmers in FGDs were able to respond to questions related to benefits from Harvest II interventions as they did not recognize the name of the Harvest II partner that was reported as working with them.

⁴³ Harvest II also subcontracted CFMA to build the capacity of Harvest II SME partners.

fertilizers. Most of the farmers who applied the knowledge gained during CamGAP training were men. Almost all the women interviewed either did not get CamGAP training or did not apply it, citing the high costs of the practices or no interested buyers. This effectively excluded them from the price premiums associated with CamGAP training and certification. These findings indicate that women face additional barriers compared to men in investing in improved technologies and practices in tree crops.

Influence and control: The results were mixed as noted above. Some farmers felt that they have developed trusting relationships with buyers. In general, these farmers are more optimistic about the future, citing price increases this year and feeling confident they would be paid promptly for their crops. Other farmers, both male and female as well as those reached by Harvest II partners and those not reached, felt they have little or no influence on value chains and recent shocks have reduced their confidence. They felt that they are at the mercy of unpredictable price changes both for crops and inputs, as well as unpredictable weather. Some felt that they cannot count on buyers coming to purchase their crops at all. In FGDs, a greater proportion of farmers were pessimistic and felt they had little influence than were optimistic.

“The market price of mangoes fluctuates without knowing the real causes.”

“I’m not sure of future involvement because I sold longan to the agricultural cooperative only once before the cooperative paused buying.”

“I am not sure of the future trade of cashew nuts because the market is unpredictable.”

Tree crop farmers

In many aspects of tree crop farming, women do not feel they are at a disadvantage. In fact, several mentioned that managing the finances enabled them to better track income. However, across all tree crop subsectors, women mentioned the difficulty with spraying chemicals because it required strength and was a health risk if they were pregnant. Several stated that when revenue was sufficient, they were able to hire workers to spray the chemicals, however when income was low, some had to do it themselves. While women farmers did not cite it as a particular disadvantage, their limited membership in cooperatives is likely to reduce their influence compared to male farmers.

Unintended impacts: Although questions regarding loan repayments were not specifically posed to tree crop farmers during FGDs, five farmers interviewed (2 females and 3 males) across the three tree crop subsectors⁴⁴ reported that they took loans, either small or large, to invest in new inputs, technologies and/or practices taught through training and technical assistance supported by Harvest II through their partners. They expected that higher yields and prices would enable them to pay back the loans. They decided to take loans, at least partly, due to the convincing opportunities introduced by the project’s partners, although Harvest II and the partners were not directly involved in facilitating the loans. Subsequently, these farmers were unable to make loan payments on schedule due to low prices, inability to sell and/or poor yields caused by adverse weather and the market disruption from the border closure during the pandemic. The inability to pay back loans resulted in increased debt and, in

⁴⁴ A total of 84 tree crop farmers were interviewed in focus group discussions or in-depth interviews, of those 61 were reached directly by Harvest II partners. Of these, 23 were mango farmers, 8 were longan farmers and 30 were cashew farmers.

severe cases, risk of losing their property. One of the mango firms that works closely with farmers also reported that some farmers were not able to repay loans taken to improve mango farming. While increased debt only occurred among a small minority of the farmers interviewed, it is important to be aware that information and training from firms can convince farmers to take loans with unintended consequences when shocks occur. This highlights the importance of risk mitigation services and other methods to increase resilience at the farm level. Profile 4 describes one example of a mango farmer struggling with loan repayment, which illustrates the cases that occurred among longan farmers, cashew farmers and other mango farmers.

Profile 4: Female mango farmer in Pailin

A female mango farmer and her daughter attended the CamGAP training conducted by PDAFF in 2020, supported by Harvest II and its partner in Battambang. She owned about 40 ha of land and grew about 20 ha of mango. After the training, she borrowed money from an MFI to invest in off-season mango as she saw a promising opportunity. She was told that the private company would come and buy the produce. That year, she could only sell the mangoes at a very low price, which was not sufficient to cover her investment. She has been indebted since. She currently only makes minimal investments in mango farming. She sells green mangoes instead of mature fruit in small amounts at a time to the local market rather than waiting to harvest at the same time as other farmers.

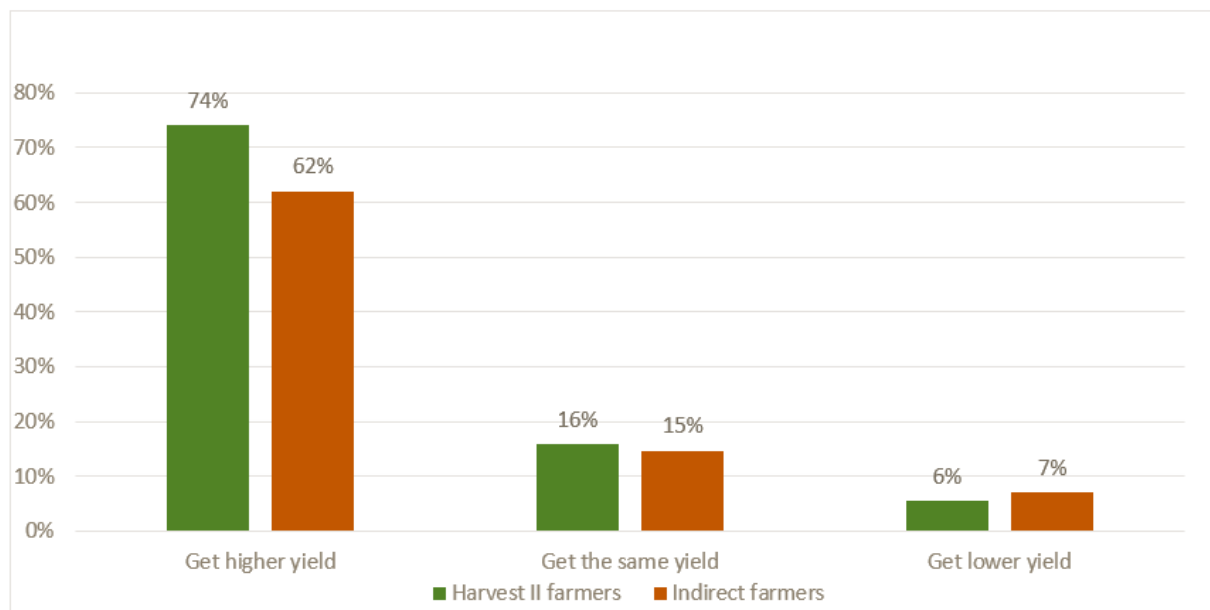
It is notable that some of the areas where Harvest II worked were not the main area for mango production, but rather areas where the volumes of mango produced are relatively small.⁴⁵ The negative impacts of COVID restrictions were likely exacerbated in these areas because, as demand fell, there was little reason for buyers to target these areas. A focus on the major production areas would encourage more sustained engagement from buyers, until demand is higher and more consistent. When the project does work in areas with lower production, additional risk management measures for farmers may be useful.

6.1.2 Vegetables

On farm benefits: More than 70% of vegetable farmers surveyed felt they had increased yields compared to before interacting with a Harvest II partner. Figure 10 shows the responses for farmers reached by a Harvest II partner directly (Harvest II farmers) and those reached indirectly by copying directly reached farmers (Indirect farmers). The results for male and female farmers were very similar.

⁴⁵ According to a GDA 2021 report, the major mango production areas are Kampong Speu, Battambang and Udor Meanchey provinces, accounting for nearly 50% of mango production in 2020.

Figure 10: Vegetable farmers' perceptions of changes in yields since they interacted with a Harvest II partner or a farmer reached by a Harvest II farmer



Note: The percentages and totals are based on multiple responses.

Overall, 93% of farmers reached directly or indirectly plan to adopt or continue at least one practice taught through training supported by Harvest II, indicating a high degree of satisfaction with the benefits of adoption. There is no significant difference in this figure between female and male farmers.⁴⁶ Table 4 breaks down the adoption of 19 different practices that Harvest II promoted through their partners and contractors. It shows that many of the practices promoted by Harvest II enjoyed strong adoption rates among those farmers who got information from a source supported by Harvest II. In fact, 7 practices had an adoption rate of over 70%: crop varieties, soil mulching, crop rotation, mounding, soil fertility management, improved fertilizer practices and smart irrigation. The table shows that farmers expect to sustain practices at a high rate and that some farmers who have not yet applied a particular practice plan to in the future. Most notably, while the adoption of nethouses is currently 27%, the expectation is that 53% of farmers who got information from a Harvest II related source will use nethouses in the future.

⁴⁶ The sample consisted of 118 male farmers and 232 female farmers. In the survey, 97.5% of male farmers and 97.4% of female farmers got information on at least one new practice. 92.2% of male farmers and 94.7% of female farmers applied knowledge they received from a Harvest II associated source for at least one practice. 100% of male farmers and 99.1% of female farmers felt they benefited from applying at least one new practice. 93.0% of male farmers and 93.4% of female farmers plan to apply at least one of the practices in the future out of those who received information from a Harvest II associated source.

Table 4: Farmers' adoption of and benefits from practices promoted by Harvest II

Improved practices	Got information		Information from Harvest II +		Applied knowledge from Harvest II +		Got positive impact from application		Will apply in the future*	
	Yes	%	Yes	%	Yes	%	Yes	%	Yes	%
Nethouses ⁴⁷	183	52%	64	35%	17	27%	16	94%	34	53%
Crop variety	171	49%	123	72%	103	84%	103	100%	101	82%
Soil mulching	299	85%	251	84%	183	73%	180	98%	184	73%
Crop rotation	280	80%	236	84%	201	85%	201	100%	204	86%
Mounding	161	46%	113	70%	93	82%	91	98%	91	81%
Integrated pest management	215	61%	156	73%	105	67%	100	95%	93	60%
Soil fertility management	224	64%	171	76%	135	79%	134	99%	141	85%
Improved fertilizer practices	238	68%	186	78%	151	81%	149	99%	153	82%
Smart irrigation	305	87%	242	79%	185	76%	182	98%	192	79%
Land preparation	27	8%	18	67%	10	56%	9	90%	10	56%
Erosion control	23	7%	13	57%	7	54%	7	100%	7	54%
CamGap practices	105	30%	77	73%	41	53%	41	100%	47	61%
Organic farming	55	16%	23	42%	1	3%	1	100%	0	0%
Participatory guarantee scheme	42	12%	28	67%	13	46%	11	85%	12	43%
Post-harvest handling practices	171	49%	116	68%	74	64%	74	100%	71	61%
Formal agreements	82	23%	32	39%	9	28%	8	89%	9	28%
FinTec/Digital financial platforms	13	4%	2	15%	0	0%	-	-	1	50%
Financial literacy training	104	30%	58	56%	32	55%	30	94%	25	43%
Supply-chain financing	16	5%	8	50%	1	13%	1	100%	1	13%

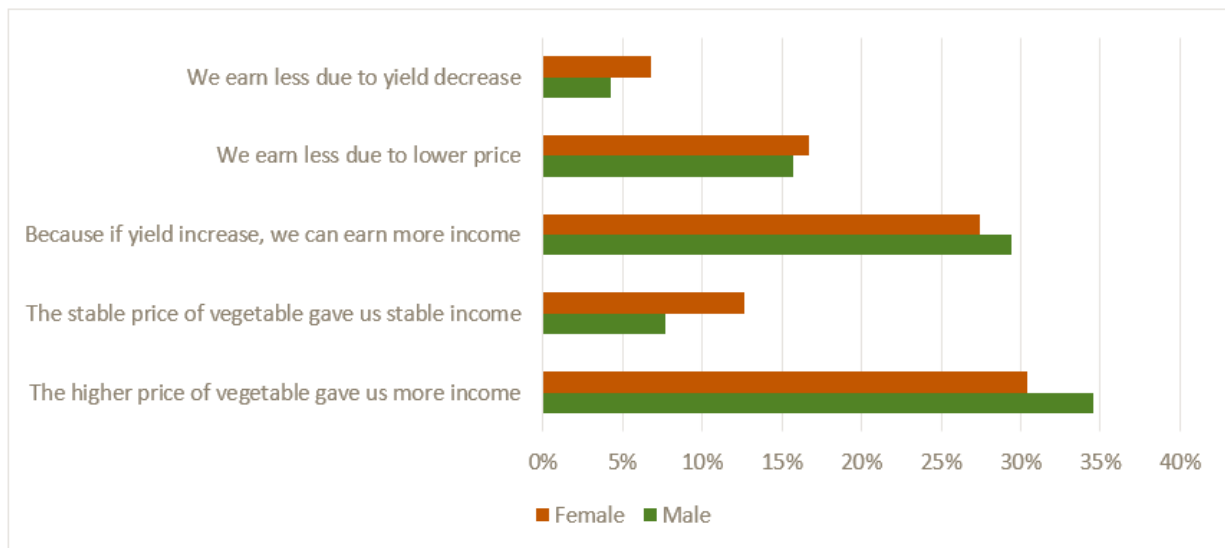
Notes:

- Total sample was 350 farmers; 300 were reached by Harvest II partners directly and 50 were influenced by those farmers reach directly.
- + includes Harvest II contractors, partners and farmers directly reached by Harvest II contractors and/or partners.
- * out of those who got information from a Harvest II + source.

⁴⁷ Nethouses were developed under the USAID Feed the Future Horticulture Innovation Lab project and have been promoted by Harvest II.

Income: Harvest II aimed to increase farmers' incomes by enabling them to increase yields so they could sell more, improve quality so that they could get higher prices and grow and sell vegetables for a greater part of the year. Many farmers benefited from increased income, more reliable income, and income for a greater part of the year. Some farmers also benefited from price stability enabled through stronger relationships with buyers and better alignment with demand. Overall, 60% of farmers felt their incomes had increased because of increased yields and/or getting higher prices for their vegetables, 11% felt their incomes were stable due to stable prices and 29% felt their incomes had decreased due to lower yields and/or getting lower prices for their vegetables. The perception of increased income between farmers reached directly and indirectly is similar, indicating that income benefits reach beyond those directly interacting with Harvest II partners. Results related to income were similar between male and female farmers, as shown in Figure 11. Typically, farm income is considered as household income rather than individual income. Thus, it is not surprising the results are similar.

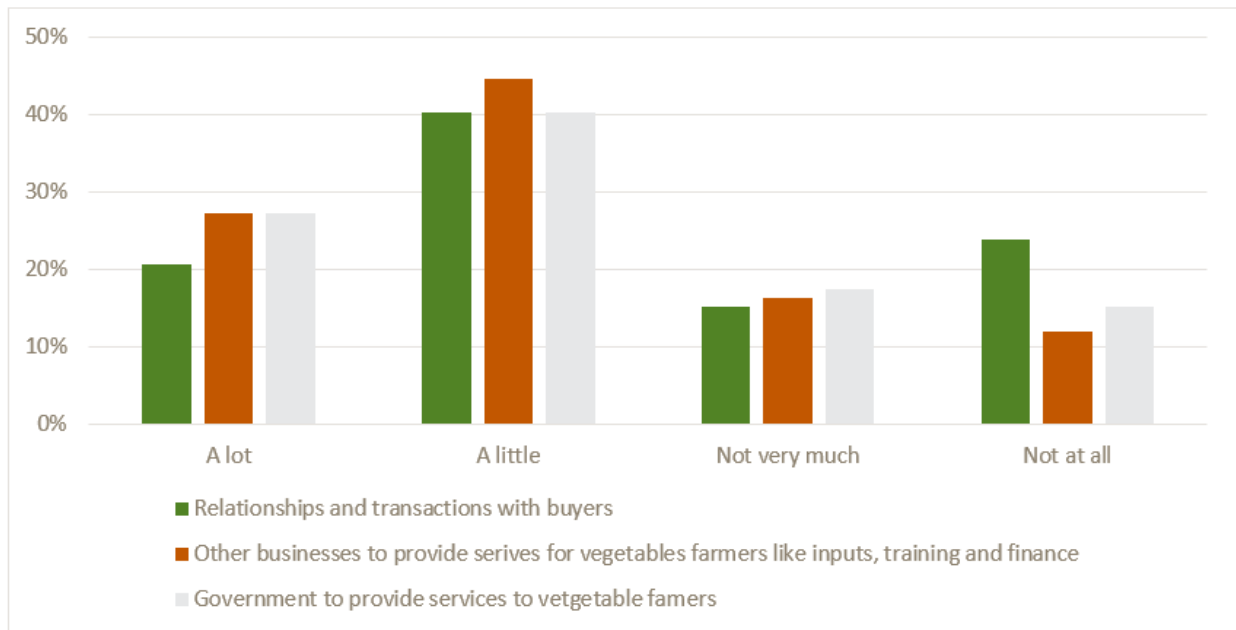
Figure 11: Vegetable farmers' perceptions of changes in income according to product yield and price



Note: The percentages and totals are based on multiple responses.

Influence and control: Some farmers' abilities to influence value chains and increase their control has improved, particularly as a result of participation in strengthened agricultural cooperatives and contract farming. Figure 12 shows the extent to which vegetable farmers think that their cooperative or association can influence different aspects of their interactions with others. Women's lower membership in cooperatives compared to men likely also means that, on average, they have less ability to influence these aspects.

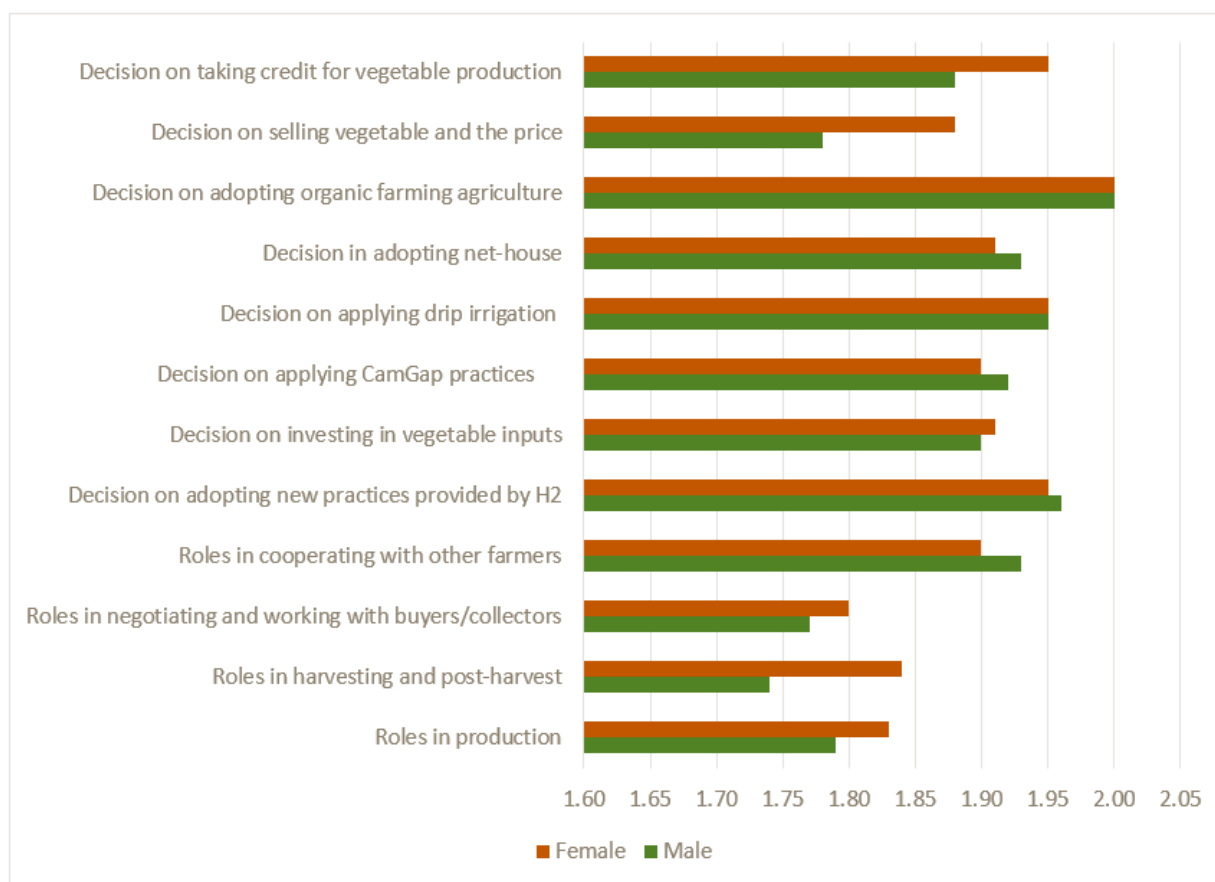
Figure 12: The extent to which vegetable farmers think that their cooperative or association can influence relationships and transactions with buyers, and other businesses and government to provide them with services



Farmers who received CamGAP certification increased their bargaining power substantially due both to the certification and to improved quality, as these are sought after by buyers. Thirty percent of both female and male farmers interviewed got CamGAP training. Application rates are also similar, with 55% of males and 52% of females applying their CamGAP training and 100% of both feeling they benefited.

Figure 13 shows how roles and decision-making between male and female farmers have changed over the last three years. It shows that women have increased or maintained their roles and decision making in activities from production to selling and even taking credit for vegetable production, but there are some areas where male farmers have taken a more prominent role such as cooperating with other farmers, decisions to adopt new practices, decisions on applying CamGAP practices and decisions on building a nethouse. The main reason for such changes was a transition in production level or types of vegetables, however women's skill sets particularly in negotiation were also cited as a reason for an increase in their involvement in particular tasks or decisions.

Figure 13: Comparison between changes in male and female roles and decision making in vegetable farming



Note: Compares mean of decision-making among male and female respondents (1= More involvement of women; 2= Same involvement of women (No change); 3= Less involvement of women)

6.2 Benefits for Other Market Actors

6.2.1 Tree Crops

Buyers, processors, and exporters cited a range of business benefits they have enjoyed since working with Harvest II, such as facilities expansion, registering new products, building connections with other businesses, increasing their understanding of markets and reaching new buyers in domestic or international markets despite COVID restrictions. A few wholesalers/exporters mentioned that they were more confident talking with their buyers as they had a better understanding of the volumes and quality they could deliver. A number of commercial service providers tested new products and reached more customers.

Many of these developments are recent and are still being tested. As discussed in the previous section, positive system change has not yet taken hold to a significant degree in the tree crop subsectors. Thus, particularly as the recovery from COVID 19 is still underway, it is difficult to gauge the extent to which

continued improvements will be possible without project support. Nevertheless, it is likely that some firms would not have survived during the COVID-19 pandemic without Harvest II support. Thus, an important benefit for many Harvest II partners is their survival during the pandemic and increased ability to explore new opportunities as markets open.

For many businesses interviewed, the changes they have made are still too small scale to make an impact on their profits, particularly as businesses were depressed during COVID restrictions. However, several businesses have increased their workforce ranging from a few to dozens. The profile of Pechenda Fruit Production Company provides an example of a company that benefited considerably from being involved in Harvest II (Profile 5).

Profile 5: Pechenda Fruit Production Company

The Pechenda Fruit Production Company, established in 2021, works with the Pechenda Agricultural Cooperative, which has a 20% stake in the company. The company focuses on providing technical advice and support to farmers and trading in fruits, mainly mango, longan and durian. Harvest II provided training to Pechenda staff and farmers in the cooperative, linked the company with potential buyers and helped with product registration and legal paperwork. Pechenda credits Harvest II for helping them increase their sales and revenue, hire more staff, reach new markets and improve the efficiency of their supply chain. Harvest II also improved the health and safety of Pechenda's workers. Farmers are more willing to join the cooperative because they are confident that there is a collection and processing facility near them. The Pechenda management also feels more confident in managing shocks, now that they have a warehouse for storage and the technical knowledge to help farmers adapt to climate change, for example getting loans to invest in solar irrigation systems. A significant barrier to continued expansion is the short validity of certifications (two years), as well as the time and cost for renewal.

6.2.2 Vegetables

In vegetables, wholesale buyers are reaching new markets in urban areas, making new connections with other businesses, and developing new business models for sales, primarily to middle and high income, urban consumer segments. These improvements are increasing their revenues and enabling some businesses to increase their workforce. The profile of Natural Agriculture Village provides an example that illustrates the types of benefits experienced by many of the vegetable firms reached by Harvest II (Profile 6).

Profile 6: Natural Agricultural Village

Natural Agricultural Village (NAV) was started by a former NGO staff member in 2012. The company initially focused on chemical free vegetable production and sales but has since moved to 'safe' vegetables using the CamGAP standard. Harvest II provided NAV with a grant to invest in CamGAP through farmer training and a skilled agronomy team. The company also received support from another organization to purchase a cold truck. The support has helped NAV launch a premium brand, Green Gold, and to expand its staff from 30 to 40 workers. NAV's owner sees increased competition in the market as more firms begin to serve the middle/upper income market segment.

A number of businesses, both supported and not supported by Harvest II, have opened or expanded retail outlets in urban areas. This rapid increase in the number of urban retail outlets, combined with the reopening of open markets, can be expected to result in some consolidation. There is already at least one example of a Harvest II supported urban retail outlet closing.

Many firms in vegetable wholesaling and retailing are owned and managed by women. Harvest II has supported a number of these, enabling them to make new connections and try new business models.

6.3 Analysis and Conclusions

There is a significant difference in the benefits for farmers between tree crops and vegetables. The difference is largely driven by the variation in the competitive environment and effects of shocks. The ability of Harvest II to effectively address market conditions also influenced the extent to which farmers reached directly through Harvest II partners benefited. The competitive nature of the vegetable market promoted stronger and more stable relationships between buyers and farmers compared to tree crops. Recognizing the incentive structure, tree crop farmers need more mechanisms to increase bargaining power. Several Harvest II approaches did contribute to greater power and influence among farmers: certification, collective action, strengthening cooperatives and the promotion of long-term relationships between buyers and farmers. Expanding these approaches will help to further balance power in the tree crops subsectors. In addition, it would be useful to study the key elements of the business models which benefited farmers to a greater or lesser degree to inform future interventions.

Benefits for farmers are significantly affected by the extent of their resilience to climate and market shocks. Many farmers who lose money due to a shock are not able or willing to invest further in new technologies, practices or inputs. This problem is exacerbated by successive shocks. Reduced investment limits farmers' abilities to take advantage of market upturns, and thus pay off debts or increase their benefits.

Both firms and farms have been adversely affected by shocks over the last three years. On the whole, firms were able to manage those shocks better than farmers, principally because they have less risk exposure to climate change. Firms, particularly in tree crops, can switch suppliers when weather adversely affects a particular area. To the extent that firms are tied to particular suppliers because of investment in their certification and quality, they are likely to be more open to funding risk mitigation strategies for farmers.

In terms of yields and incomes, women farmers have often benefited as much as men, not the least because incomes are typically shared within a household. However, women farmers still face disadvantages and challenges regarding control and influence across all subsectors. Without specific efforts to understand and address barriers to women's influence, it is unlikely this will change.

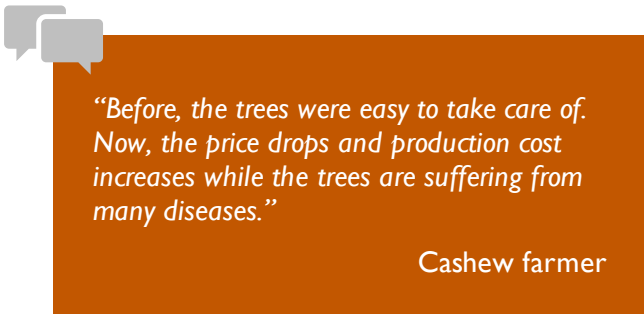
In vegetables, adoption of improved technologies and practices has been an important factor in enabling farmers to increase yields and incomes. Linear regression helped to identify factors that increase adoption of the improved technologies and practices that Harvest II promoted.⁴⁸ These are:

- being reached directly, rather than indirectly, by a Harvest II partner,
- association/cooperative membership,
- plans to expand vegetable production,
- land size,
- a long-term relationship with a collector/buyer, and
- youth taking a role in vegetable production in the family.

Farmers who were reached directly by a Harvest II partner have improved practices more significantly compared to those reached indirectly. Farmers who are association members and/or farmers having long-term relationships with buyers/collectors are more likely to adopt improved practices. Furthermore, while being in a long-term relationship with a buyer is not correlated with the perception of higher income, it is correlated with expansion of vegetable production and having more influence over transactions. This analysis indicates that the choices of Harvest II to work with vegetable associations as well as to promote long-term relationships between farmers and buyers were important to increasing farmer adoption of new practices and enabling expansion. Another factor that could promote adoption of new practices is encouraging youth to take roles in vegetable production.⁴⁹

7 Question 3: Climate Change Objectives

Farmers and other value chain actors are experiencing considerable negative impacts from climate change. Shifting seasonal rain patterns, heavier than usual rain, drought and hotter than usual weather in different areas have reduced yields significantly, degraded quality, increased the incidence of pests and diseases, and increased costs for irrigation and inputs, for example. The unpredictable weather patterns increase risk and pose challenges in determining the appropriate timing to induce flowering and apply chemical treatments to tree crops. If it rains during flowering or shortly after pesticide application, the investment in these efforts largely goes to waste. Adapting to climate change required investment, for example net houses and resilient seeds for vegetable farmers and irrigation for longan farmers.



“Before, the trees were easy to take care of. Now, the price drops and production cost increases while the trees are suffering from many diseases.”

Cashew farmer

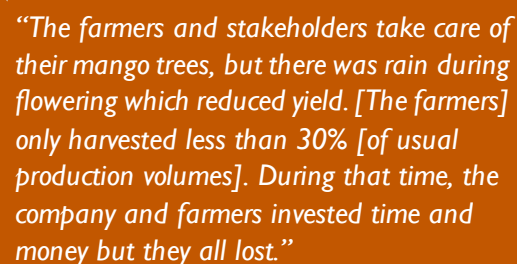
⁴⁸ Regression model: F-test: 12.848, sig. = 0.00, N = 319

⁴⁹ Variables tested which are not significant: provinces, gender, age group, number of people in the family, number of people active in vegetable production, main household occupation, vegetable as main income, trying a new practice in the last crop, and climate impact.

When farmers' yields or quality decrease, it's harder for buyers to get the quantity and quality they want. Some buyers are adapting by developing alternative sources of produce in different areas so they can select the best in any particular year. This works well for the buyers, but not the farmers. Other companies try to support their supplier farmers, which increases their business costs.

7.1 Improving Resilience to Climate Change Impacts

In vegetables, Harvest II has promoted technologies and practices that help farmers to adapt to climate change. Harvest II, other projects and government agencies have promoted drip irrigation, resulting in widespread adoption of this affordable technology that saves farmers time as well as reduces water use. Nethouses, an effective technology promoted by Harvest II and others, were developed under the USAID Feed the Future Horticulture Innovation Lab. Ninety four percent of farmers who use a nethouse reported that they have benefited from it. Adoption of nethouses was less than cheaper technologies such as drip irrigation and changes in farming practices, particularly among farmers that did not receive any support from Harvest II or another project. (See Table 5.) Harvest III could further build on progress by working with market actors on lowering costs of technologies and sustainable financing solutions for purchasing technologies.



“The farmers and stakeholders take care of their mango trees, but there was rain during flowering which reduced yield. [The farmers] only harvested less than 30% [of usual production volumes]. During that time, the company and farmers invested time and money but they all lost.”

Mango buyer

Table 5: Farmers' adoption of Harvest II promoted technologies

Practices	Type of Farmer	Got information	Got information from Harvest II +	Applied knowledge from Harvest II	Got positive impact from applying knowledge	Will apply in the future from those who got information from Harvest II
Smart irrigation: (e.g., drip)	Farmers reached by Harvest II and partners directly (n = 300)	89% ** (n = 226)	79% (n = 210)	78% (n = 163)	98% (n = 160)	80% (n = 169)
	Farmers who copied directly reached farmers (n = 50)	78% ** (n = 39)	82% n = 32	69% n = 22	100% n = 22	72% (n = 23)
Nethouse	Farmers reached by Harvest II and partners directly (n = 300)	57% *** (n = 171)	37% ** (n = 63)	27% (n = 17)	94% (n = 16)	54% (n = 34)
	Farmers who copied directly reached farmers (n = 50)	24% *** (n = 12)	8% ** (n = 1)	0% (n = 0)	-	0% (n = 0)

Notes:

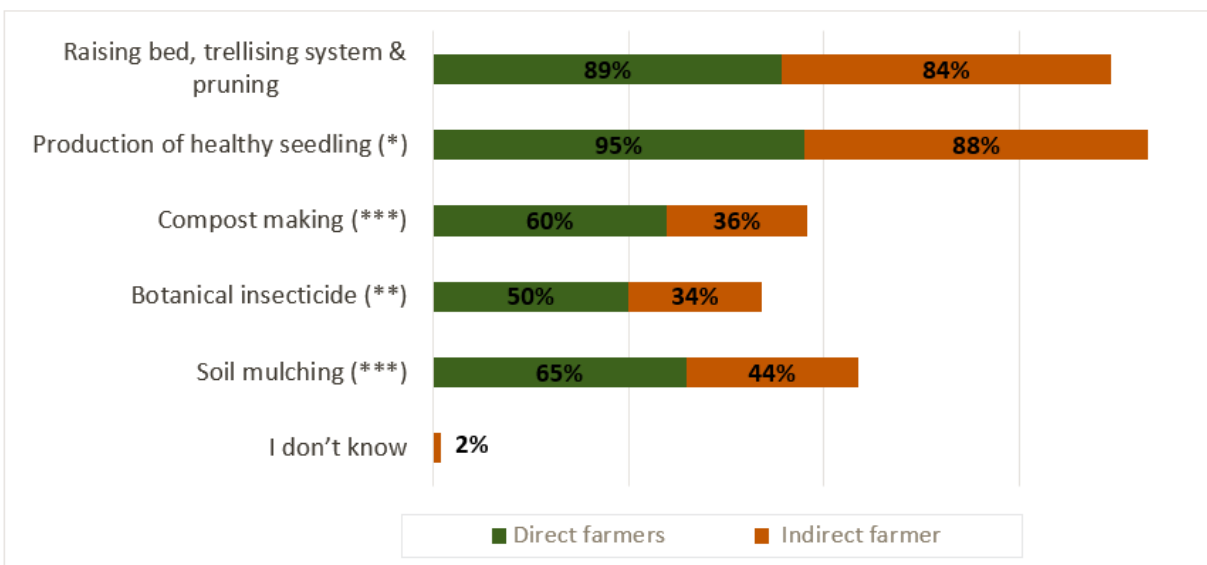
- + includes Harvest II contractors, partners and farmers directly reached by Harvest II contractors and/or partners.
- Chi-Square test: *** = 0.01, ** = 0.05, * = 0.1

Harvest II also promoted a number of practices that support climate resilience among vegetable farmers. Figure 14 shows the adoption of these practices among farmers reached directly by Harvest II contractors and partners and those who copied the practices of those reached directly. The adoption rates are higher than for technologies, likely because costs are less. In addition, it is notable that the farmers who Harvest II had previously found did not adopt a new practice are now adopting those practices in similar numbers as others reached by Harvest II, indicating that it can take farmers several years to adopt a particular practice or technology.

“Regarding vegetable cultivation in nethouse – it’s more efficient but also helps to adapt to climate change. It combats heat stress and flooding – but also allows for modern irrigation. We’re trying to promote SMART agriculture ... so each step of the way there are techniques that can be used...”

Contracted vegetable productivity consultant

Figure 14: The adoption of climate resilient practices by vegetable farmers who were directly and indirectly reached by Harvest II partners



Note: Chi-Square test: *** = 0.01, ** = 0.05, * = 0.1

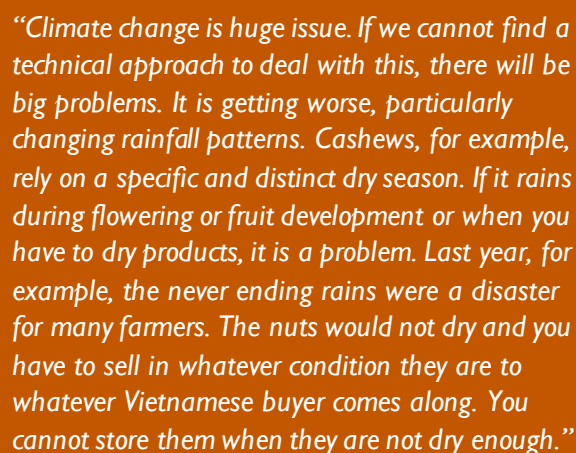
Building the capacity of Harvest II partners, particularly input suppliers and cooperatives, to provide information to farmers on climate adaptation has perhaps been the most important contribution of Harvest II on this issue, because it is likely to be more sustainable than information from contractors. While buyers may shift suppliers in response to climate change induced challenges, input suppliers have an incentive for as many farmers as possible to successfully adapt to climate change and agricultural cooperatives serve their membership. There are positive examples of Harvest II supporting input suppliers and cooperatives providing information on climate change adaptation to farmers in a sustainable manner (See Profile 7 for an example). One agricultural cooperative chair said, “Due to climate change, the newcomers and existing farmers need information on climate resistant varieties and resilient techniques. The agricultural cooperative is the repository for that information in this area. So people join to get access to that information.” In another example, Harvest II supported the Cashew Association of

Cambodia (CAC) to share production information with cashew farmers. A cashew farmer interviewed mentioned that she asked questions about adapting to climate change on the CAC Telegram group and followed the instructions provided with good results.

Profile 7: East-West Seeds (Cambodia) Co., Ltd.

East-West Seeds is a multinational vegetable seeds company with a focus on smallholder farmers. With a grant from Harvest II, East-West Seeds trained farmers, agro-input dealers and collectors on climate smart vegetable production, both face-to-face and online. The training covered land preparation through to harvest and was tailored to different locations based on what types of products collectors in each area needed. East-West Seeds also took a role in linking farmers with collectors and other input dealers. In total, the company reached more than 10,000 farmers over two years. The company found that the training increased their sales substantially. They have continued providing training to farmers, although on a smaller scale than during the grant period.

The promotion and adoption of climate change adaptation technologies and practices was much lower in tree crops, although important improvements were still made. Harvest II contributed to increasing the provision of information to farmers from buyers and associations as well as promoting practices that conserve natural resources and help farmers adapt to climate-related changes such as lower water availability and increased pests. The focus group discussions indicated that only a few tree crop farmers received information on climate smart agricultural practices. Adoption of smart irrigation technologies was low primarily because tree crops are grown on much larger areas than vegetables, making the investment too expensive for most farmers. Many farmers and firms felt that there are no solutions or that the solutions available are not effective enough. For example, a number of cashew farmers said that there is no solution to the problem of heavy rains causing flowers to fall or fruit to rot and fall. A mango farmer commented that spraying remedial chemicals is 50% effective against heavy rains causing flower and fruit fall.



“Climate change is huge issue. If we cannot find a technical approach to deal with this, there will be big problems. It is getting worse, particularly changing rainfall patterns. Cashews, for example, rely on a specific and distinct dry season. If it rains during flowering or fruit development or when you have to dry products, it is a problem. Last year, for example, the never ending rains were a disaster for many farmers. The nuts would not dry and you have to sell in whatever condition they are to whatever Vietnamese buyer comes along. You cannot store them when they are not dry enough.”

Organic cashew buyer

Harvest II gave grants to two companies specifically for organic cashew production. Growing organically reduces the risks of losing money on chemical application due to unexpected rains. However, several respondents questioned the commercial viability of organic cashew production for some markets, unless the price premium increases to a level that adequately compensates farmers for lower yields. In addition, climate change still affects organic production. Finally, sector strategy research done for Harvest II noted that the organic segment is only 6% of the market in Europe, and 4% in the United States⁵⁰, so it is

⁵⁰ Fitzpatrick, J. (2019). Situational Analysis – Cambodian Cashew Sector. USAID Feed the Future Harvest II.

unlikely in the short to medium term that organic solutions will address the needs of the majority of farmers.

The evaluation research indicated that other organizations were the primary drivers of climate change adaptation. MAFF and PDAFFs have encouraged farmers to dig ponds for irrigation and PDAFFs are providing information on weather to help farmers know when to induce flowering or apply pesticides in tree crops. The Ministry of Water Resources and Meteorology provides regular forecasts, as do several weather apps.⁵¹ However, social media seems to be the preferred source; several farmers said that they used weather information on Facebook to ensure they avoided applying chemicals before rain. Weather indexed crop insurance is being piloted by Forte Insurance with support from the Asia Foundation and the RGC. Several seed companies are adapting vegetable seeds for climate change. One Harvest II supported company reported that it is working with a government agency on research for a new variety of cashew that will be resilient to increased climate change impacts in the future.

Harvest III could increase farmers' abilities to adapt to climate change by supporting innovation in risk management services, complemented by other, USAID sponsored efforts to support longer-term climate change adaptation measures.

7.2 Reducing Greenhouse Gas Emissions

Overall, horticulture is not a high emitter of greenhouse gasses (GHG) in Cambodia in comparison to other sectors, such as construction. In fact, horticulture can contribute to climate change mitigation because trees and plants absorb carbon dioxide.⁵² For example, cashew trees have net carbon sequestration of 37 tons carbon per hectare over 100 years based on two rotations above a vegetation carbon baseline of 2.8 tons per hectare. Studies in West Africa confirm that cashews are high capacity carbon sinks.⁵³ A study on behalf of the US Mango Board found that mango trees could sequester carbon at a rate of seven times the rate of carbon emissions from production of mangoes.⁵⁴

There are number of activities in horticulture that produce GHG, including the following:⁵⁵

- The production and transportation of fertilizers and pesticides are the most significant source of GHG in horticulture.⁵⁶
- Waste contributes to GHG because methane is emitted when waste decomposes.⁵⁷

⁵¹ For example, the [Khmer Smart Weather Forecast](#) and [Khmer Weather Forecast](#).

⁵² Lenka, S., N. Lenka, V. Sejian and M. Mohanty (2015). [Contribution of Agriculture Sector to Climate Change](#). Chapter 3 in Sejian, V. et al. (eds.) *Climate Change Impact on Livestock: Adaptation and Mitigation*. Springer India.

⁵³ Fitzpatrick, J. (2019). *Situational Analysis – Cambodian Cashew Sector*. USAID Feed the Future Harvest II.

⁵⁴ Fitzpatrick, J. (2021). *Situational Analysis – Cambodian Mango Sector*. USAID Feed the Future Harvest II.

⁵⁵ Agriculture Victoria (2020). [Greenhouse gas emissions from horticulture](#).

⁵⁶ Lenka, S., N. Lenka, V. Sejian and M. Mohanty (2015). [Contribution of Agriculture Sector to Climate Change](#). Chapter 3 in Sejian, V. et al. (eds.) *Climate Change Impact on Livestock: Adaptation and Mitigation*. Springer India.

⁵⁷ Ibid.; In-depth-interview with horticulture buyer.

- Fuel and electricity use in irrigation, farm equipment, factories and transportation produce GHG.
- Tillage can release GHG from the soil.⁵⁸

Reducing GHG emissions was not a focus of Harvest II. However, promoting horticulture can contribute to climate change mitigation because it absorbs carbon dioxide, and some Harvest II interventions addressed GHG emissions, particularly through the Sustainable Landscapes Fund. Harvest II promoted alternative energy sources, albeit on a relatively small scale. For example, there was some promotion of solar pumps for farms and solar panels for factories. Harvest II also supported alternatives to chemical inputs, particularly in the vegetable subsector, to help farmers meet the demand for safe produce. For example, training from some Harvest II partners promoted the use of manure and other organic substitutes for chemical fertilizers. Water smart technologies such as drip irrigation reduce the need for energy to pump water.

Harvest II partnered with a number of environmentally conscious firms that were already using or experimenting with ways to reduce their carbon footprint or that of others in the horticulture sector. For example, Kirirom set up a mango processing factory, specifically to reduce wastage in mangoes. The company also dries and sells the mango skins for animal food and is testing biogas and biomass from mango waste water as a cooking gas. Confirel, another mango processor, uses almost 100% of their waste to produce compost fertilizer and feed for fish and pigs, as well as to produce energy. Harvest II support to other processors to buy crops resulted in a reduction of waste, particularly during the COVID pandemic when exports were severely restricted. Harvest II partner, Husk Ventures, is working on commercializing rice husk biochar products, recognized as a promising carbon removal technology by the Intergovernmental Panel on Climate Change (IPCC).

Harvest II supported some firms to expand their processing factories. For example, Harvest II supported Misota Food Import Export Co., Ltd. to add a new processing line to process dried oranges, Santana Agro Products Co., Ltd. to expand their cashew drying facility and purchase new machinery and Kirirom Food Production Co., Ltd. to expand their cool room and install additional ovens for drying mangoes. The project used an environmental check before a grant was awarded and continued with environmental monitoring during implementation to minimize environmental impacts and maximize efficiency. Nevertheless, it is likely that construction and increased use of energy inevitably resulted in some increased GHG emissions. The evaluation did not find any factories running completely on renewable energy sources, and many used diesel in addition to other energy sources. This highlights a wider problem related to the availability and use of appropriate renewable energy solutions in Cambodia.

Harvest II had a policy to not support or encourage farmers or firms who deforest land. Interviews indicate that most farmers who expanded land for crops that Harvest II promoted were switching from

⁵⁸ Bhattacharyya, S.S., F.F. Leite, C.L. France, A.O. Adekoya, G.H. Ros, W. de Vries, E. M. Melchor-Martínez, H. M.N. Iqbal and R. Parra-Saldívar (2022). [Soil carbon sequestration, greenhouse gas emissions, and water pollution under different tillage practices](#). Science of The Total Environment, Volume 826.

another crop or using fallow land. While reliable information on deforestation is scarce, available information indicates that deforestation in horticulture resulted more from starting plantations, often through economic land concessions on formerly protected land, rather than encroachment by smallholder farmers.

There are two interesting developments of note regarding GHG emissions that are not related to Harvest II. First, one Harvest II partner company is in communication with the Ministry of Environment (MoE) to make tree crop fields eligible for carbon credits because they absorb carbon dioxide. However, this is a long process and to integrate tree crops into carbon markets sustainably would require investment in the processes and systems for certification and sales. Second, in recent years, a number of solar power companies have entered Cambodia. They are targeting agriculture as a significant market, particularly solar power for irrigation.

7.3 Choice of Commodities

Climate change adaptation and mitigation were not among the criteria used to assess which subsectors Harvest II targeted. However, farmers have a number of alternatives when choosing what to grow on their fields that are not appropriate for growing rice. While soil and climatic conditions dictate, to some degree, which crops they can grow, they typically can choose among crops such as cashew, longan, mango, cassava, rubber, maize, soybeans and mung beans, as well as vegetables on smaller areas. Evidence from the evaluation indicates that farmers switch crops primarily in response to short-term prices rather than longer-term market trends, while also considering other factors such as input and labor costs and their own expertise. Therefore, the evaluation analyzed the potential contributions of the targeted crops – cashew, longan, mango, and vegetables – to climate change mitigation and adaptation in comparison to alternatives.

Cashews are best adapted to seasonally dry tropical climates; they are drought and heat tolerant and typically do not require irrigation.⁵⁹ Longans require access to irrigation⁶⁰ and increasing drought could have an impact on production. Mangoes have a high water usage compared to other fruits, using on average 1,000 liters of water per 1 kg mango.⁶¹

The most common substitute for cashew, mango and longan is cassava. There is some evidence that these tree crops are likely to absorb more carbon than cassava and other ground crops because the trees are bigger in size. Cassava has also contributed more to forest clearing than other crops. There is some evidence that cassava depletes soil nutrients more than other crops. Crops that grow more slowly

⁵⁹ International Finance Corporation and the European Union (2010). [Prospects for Cambodia's Cashew Sub-sector](#); Fitzpatrick, J. (2019). Situational Analysis – Cambodian Cashew Sector. USAID Feed the Future Harvest II.

⁶⁰ Fitzpatrick, J. (2021). Situational Analysis – Cambodian Longan Sector. USAID Feed the Future Harvest II.

⁶¹ Fitzpatrick, J. (2021). Situational Analysis – Cambodian Mango Sector. USAID Feed the Future Harvest II.

and thus require less tillage, such as tree crops, are likely to mitigate GHG emissions more than crops that grow more quickly and thus require more tillage.⁶²

The practices that farmers and firms use in production and postharvest are a significant factor in reaching climate change mitigation objectives. There is evidence that most crops can be produced responsibly provided that good practices are used. For example, intercropping and rotational cropping can preserve soil nutrients and maximize absorption of GHGs. Evidence from the evaluation shows that some farmers intercrop cassava or beans with tree crops for the first few years until the trees mature. With respect to climate change adaptation, there are more readily available solutions for farmers growing vegetables compared to tree crops. A deeper analysis would be required to determine which crops are likely to be suitable once climate change impacts in Cambodia increase.

7.4 Conclusions

Vegetable farmers are benefiting from a variety of technologies and practices that help them to adapt to climate change, promoted by Harvest II and other projects and institutions. There are fewer solutions available for tree crop farmers. Technologies and practices are more likely to be adopted if they are low cost and/or have a clear, short-term economic advantage. In addition, farmers will only invest in adaptation if they are reasonably sure there will be buyers offering viable prices.

The inability to adapt to climate change poses a significant threat to farmers' incomes and stability on a year-to-year basis and over the long term. Crop insurance is one way to help farmers be resilient to climate change impacts, and is required by some international buyers. The CEO of Chamroeun Microfinance, a Harvest II microfinance partner, stated that, "*having an insurance product is key to adapting to climate change.*"

Despite not focusing on reduction of GHG emissions, some Harvest II interventions have made a positive contribution to reducing GHG emissions in horticulture. There are opportunities to strengthen this contribution by identifying and supporting value chain firms and specialized product and service providers taking the lead in this area. The crops chosen by Harvest II were reasonable choices in relation to climate change objectives. Evidence indicates that how crops are grown and processed has a greater impact on climate change objectives than which crops are grown. While Harvest III can focus on other criteria, particularly market demand, when selecting target crops, further promoting practices among firms and farmers that address climate change objectives will build on the progress from Harvest II.

⁶² Carver, C. (2023) Interview. Ms. Carver has a Masters in Sustainability and Global Development Practice and a Graduate Certificate in Sustainable Food Systems. She has been working in fruit production in Cambodia for over 4 years; RGC Department of Agro-Industry (2023) interview; MAFF Climate Change Technical Working Group (2023) interview; Fitzpatrick (2019) Situational Analysis Cambodian Cashew Sector; Pennapa, K. (2005) [Carbon Sequestration in Cassava and Para Rubber Plantation, Rayong Province](#). Mahidol University, Bangkok; Jha, P. (2023) [CAC urges rapid cashew policy implementation](#), Khmer Times; Nicolaides, P. (2021) [12 Best Crops for Carbon Sequestration](#); Konsager, R., J. Napier and O. Mertz (2012) [The carbon sequestration potential of tree crop plantations](#), Springer.

Climate change is already having a big impact on the horticulture sector in Cambodia, and all signs are that the situation will get worse. In addition to solutions to current challenges, a long-term perspective and research into future solutions is needed. One prominent cashew company manager stated that *“because of climate change, we have to consider looking at different production areas. Specifically, some areas will not be able to produce any more and other areas will be able to produce. But the issue is, there might not be enough expertise in Cambodia alone to address climate change. Other countries, such as Japan, US and EU, with greater expertise need to support Cambodia with climate change adaptation and industrialization of cashew.”* There are opportunities for in-depth analysis of which crops will be suitable for Cambodia as climate change intensifies, as well as promoting intercropping and rotational cropping rather than monocropping.

8 Question 4: Preventing Negative Environmental Impacts

8.1 Measures Harvest II Took

Harvest II consistently followed a process for identifying and addressing environmental risks when providing grants to firms. This consisted of first reviewing the activities proposed by a prospective grantee and screening each of them for environmental risks using environmental review forms. Harvest II then worked with each grantee firm to develop an Environmental Mitigation and Monitoring Plan (EMMP) to address any risks found. The process complied with reasonable and relevant environmental guidelines.

Harvest II grants not only addressed environmental risks at the firm level but also often provided funds to train farmers in good agricultural practices, including practices that address negative environmental impacts. Harvest II worked with grantees to build awareness and capacity among farmers to manage risks related both to human health and environmental protection. This included the use of practices and personal protective equipment (PPE) recommended on pesticide labels. Harvest II also promoted the use of state-of-art CamGAP training materials and made these available to all interested firms and farmer organizations. Pesticide Evaluation Report and Safe Use Action Plan (PERSUAP) provided information on each crop, pests, diseases, weeds, and integrated pest management (IPM) tools. Training in IPM was provided to minimize the use of synthetic chemical pesticides.

Profile 8 provides an example of how Harvest II integrated improved environmental practices into a partnership to not only increase the quality of fruits but also to increase farmers' incomes and enable them to improve environmental stewardship.

Profile 8: Cambodia Agricultural Cooperative Alliance

The Cambodia Agricultural Cooperative Alliance (CACA) has 1,200 member agricultural cooperatives representing 150,000 households. CACA strengthens the management of member agricultural cooperatives and links them with potential buyers. Harvest II supported CACA to provide CamGAP training to longan farmers and facilitate their applications for certification. About 150 farmers got certified, which increased the price for their longan by approximately KHR300/kg. The training addressed both productivity as well as environmentally friendly practices.

8.2 Effectiveness of These Measures

From an environmental perspective, the firms that Harvest II funded fall into two categories:

- socially and environmentally conscious firms that already complied with responsible environmental practices, some out of conviction and some because of the requirements of certifications they had or aimed to get (see Table 6, Angkor Green Investment and Development for an example), and
- firms that did not meet all requirements and so were required to improve their environmental practices as part of the grant (see Table 6, Buyer B for an example).

For those in the second category, the firms interviewed provided examples of changes they had made to meet the requirements, such as building a wastewater treatment or storage system for their processing factory. Harvest II also conducted conformity checks to ensure compliance with the agreed actions to address environmental issues.

Table 6: Harvest II partners' environmental practices

Angkor Green Investment and Development (Cambodia) Co., Ltd.	Buyer B
<p>Angkor Green Investment and Development (AGID) started in 2011 with the ambition of becoming a leading innovator in Cambodian agricultural inputs. Since then, they have also started selling agricultural equipment and exporting agricultural products, particularly fresh and processed mangoes. The company has a keen focus on environmental management both out of conviction and to get the certifications required for export to Western markets. Harvest II supported AGID to train farmers in CamGAP and help them to gain certification, ensuring that they used inputs appropriately to protect the environment and with safe handling practices to protect their health. The company also provides technical assistance to a small group of suppliers to produce mangoes off-season and meet pesticide residue restrictions for Western markets.</p>	<p>Company B is a medium sized cashew processing company established in 2018. Harvest II provided the company with a grant to expand, improve quality and increase export readiness. Prior to receiving the grant, Harvest II inspected the company's facility and identified that they needed to improve wastewater treatment. This improvement became a milestone in the grant. The company also worked closely with agricultural cooperatives supplying them, inviting experts to train farmers on improved practices to increase productivity, and providing advice on food safety during primary processing of the cashews.</p>

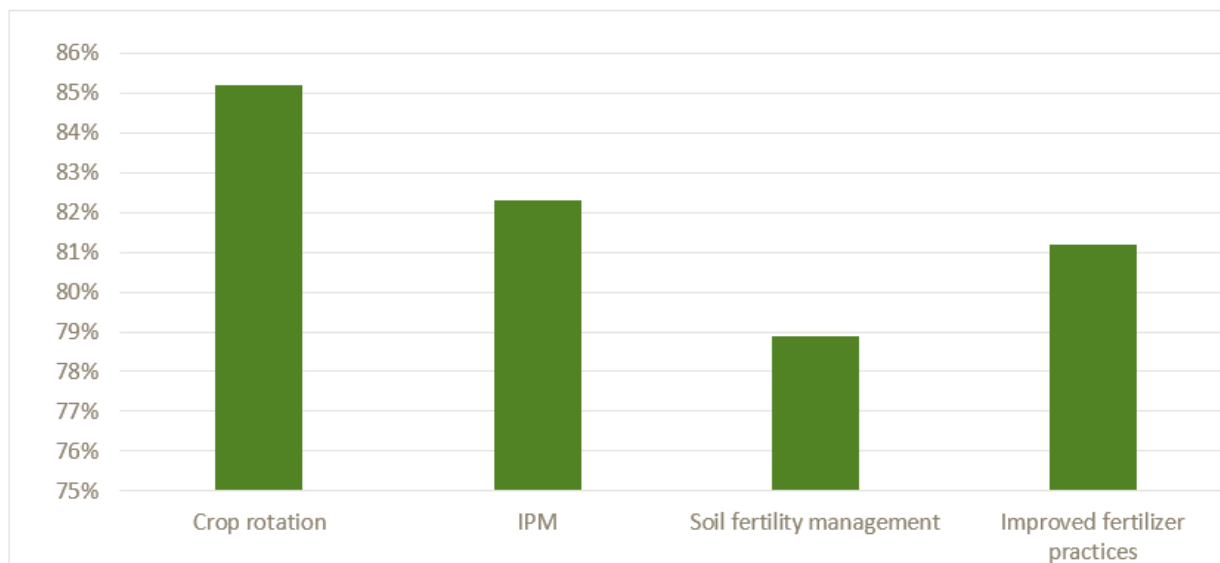
The farmer training supported by Harvest II addressed a number of key, overlapping areas related to environmental impacts: IPM, CamGAP practices, such as appropriate application of pesticides and use of natural pesticides, improved fertilizer practices, smart irrigation, climate smart agriculture and organic farming practices. Each grant only addressed some, and not all these practices. The areas addressed are appropriate to environmental stewardship and many of them overlap with the practices that help farmers adapt to climate change discussed in Section 7.

8.3 Scale, Sustainability and Depth of Adoption of New Practices

Evidence from the evaluation suggests that Harvest II firms that received grants will continue with the changes they had made in relation to environmental practices within their firms. In addition, several are seeking funding from Harvest III or elsewhere to take additional measures, particularly installation of solar energy systems that not only reduce environmental harm but also save money on energy, a significant cost for firms. Grants that included an environmental component typically helped firms to make investments to adopt environmentally friendly practices that also reduced costs or increased quality, so it made sense to continue benefiting from those investments. Furthermore, adopting environmentally friendly practices is also often required to comply with export regulations.

Evidence on the scale, sustainability and depth of farmer practice changes is mixed. In vegetables, there was widespread adoption of many of the practices. Figure 15 shows the percentage of vegetable farmers who applied selected practices out of all those who got information on them directly or indirectly from a Harvest II source, showing strong adoption rates for all practices. Initial application of environmentally friendly practices was similarly high among those who got information in tree crops.

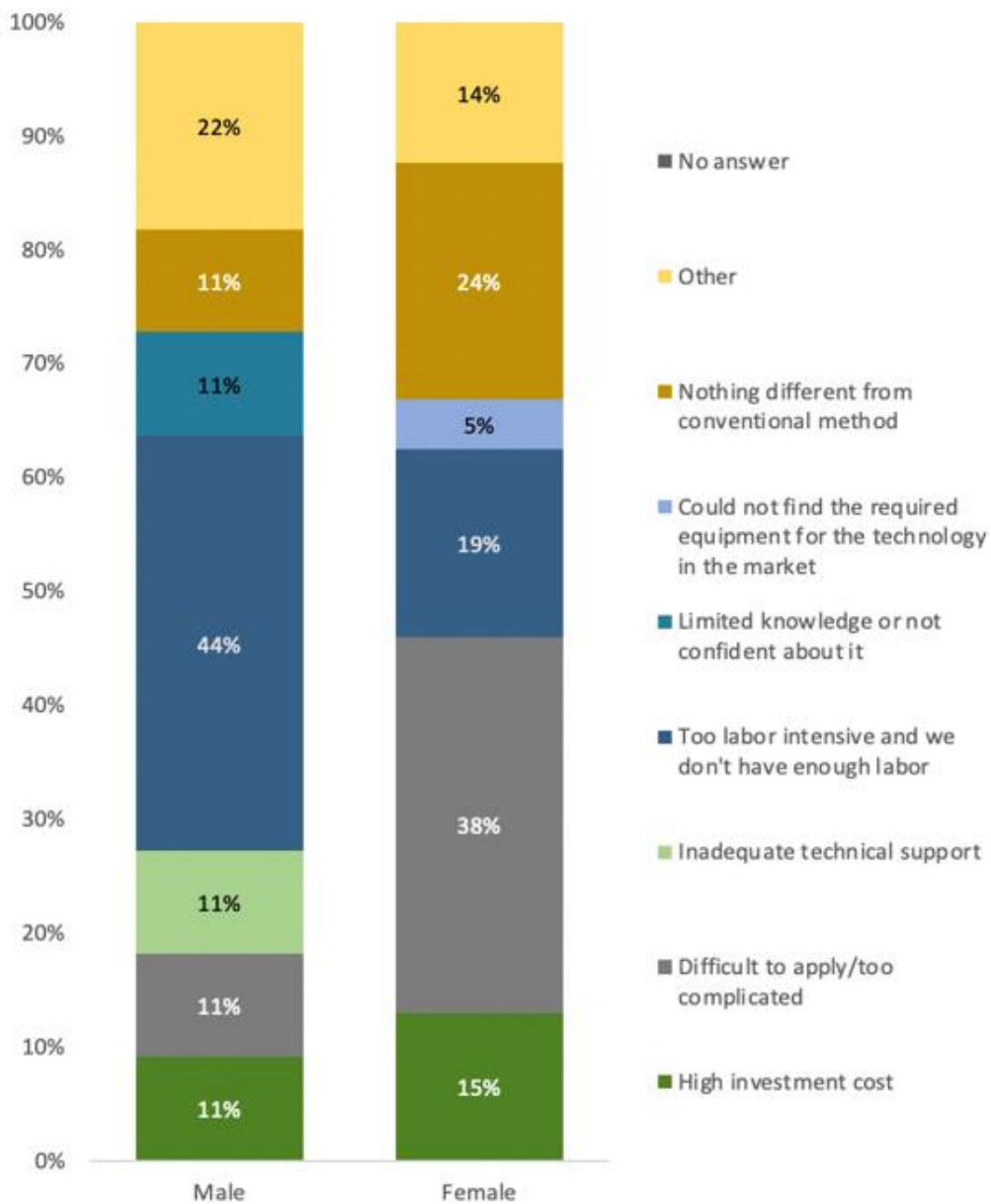
Figure 15: Percentage of vegetable farmers who applied selected environmentally friendly production practices out of those who got information on the practices directly or indirectly from a Harvest II source



The overwhelming reason reported by farmers for applying the practices was that it increased the farmer’s yields, and/or was profitable. However, some farmers who applied a practice did not intend to

continue. The reasons for not applying or not continuing to apply the practices are instructive, indicating that farmers face a range of constraints to applying various practices. The findings also show that female farmers tend to be slightly more sensitive to costs and difficulty of application than male farmers, while male farmers are more concerned about availability of labor. See Figure 16 for an example from soil fertility management in vegetable production that illustrates these findings.

Figure 16: Among vegetable farmers who got information on soil fertility management but did not apply it, the reasons they do not plan to apply it in the future



Note: The percentages and totals are based on multiple responses.

Tree crop farmers interviewed voiced more concerns about some of the practices than those in vegetables, increasing the likelihood that they may stop application or only partially apply. For example, some tree crop farmers who received training on IPM said they were not or only partially implementing it because it takes considerable time, or it was not effective. Some tree crop farmers were concerned about the costs of applying new inputs or about the time it takes to produce natural pesticides, for example.

Nevertheless, some tree crop farmers felt they got good results from applying new practices. For example, several stated that CamGAP practices helped to reduce pollution and create a clean environment for the farm. A farmer mentioned that she adopted the improved fertilizer practices recommended because she trusted the technical advisor who provided the recommendation as he was an agricultural specialist, and she is sustaining the practice because she received a high yield with the trees growing a lot of new leaves. Some farmers mentioned that they would sustain organic cashew farming practices because these had enabled them to save money and avoid the significant price increases associated with chemical fertilizers and pesticides.

The findings of the evaluation indicate that the sustainability of the information, advice and training provided to farmers on environmental practices is mixed. A few firms interviewed, who provided training under a grant, said that they could not provide training without external support. Most, however, intend to continue the provision of training to farmers started with Harvest II support at a reduced level, indicating a level of commitment to provide farmers with support that may not have been present before.

8.4 Conclusions

Harvest II's environmental processes related to grants were sound with adequate results and positive indications of sustainability at the firm level. Harvest II supported activities to prevent negative environmental impacts and improve environmentally friendly practices among farmers including training, technical assistance, technologies and improved inputs. These efforts had mixed results. On the positive side, many farmers perceived that the practices improve their yields and profits as well as address negative environmental impacts. On the negative side, promotion of the practices may not have sufficiently considered farmers' constraints, and the evidence does not suggest that monitoring identified these issues and was used to improve training, technical advice and complementary interventions to address the constraints. Most supported firms expect to continue training for farmers at a reduced level. Analyzing and addressing the barriers to sustainability of practices will further enhance the project's approach.

9 Recommendations

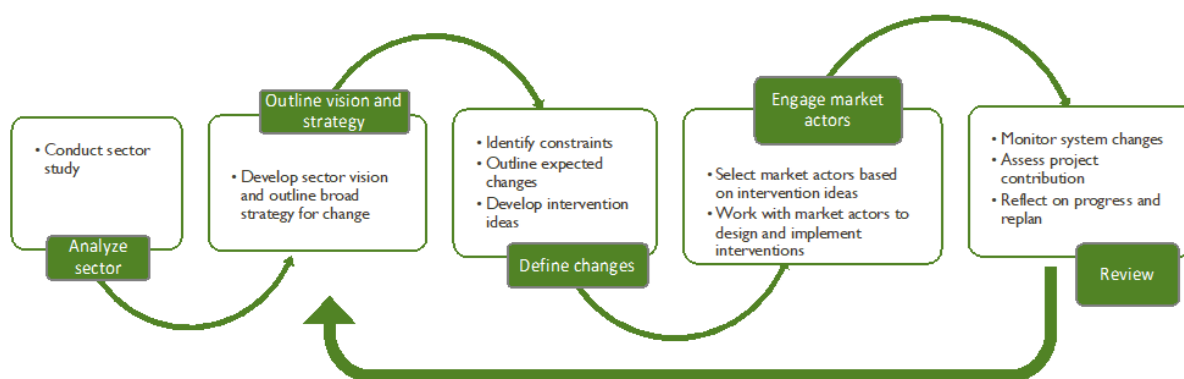
The evaluation team facilitated a workshop with USAID/Cambodia, MSP and Harvest III staff members to consider the findings above and co-create recommendations for Harvest III and USAID/Cambodia. The recommendations below summarize and extend those developed during the workshop.

Recommendation 1: Strengthen the process for promoting system change

Experience in other MSD projects indicates that consistent adherence to an iterative process is important to effectively promoting system change.⁶³ That process, summarized in Figure 17, includes the following key elements:

- Analyze the subsector to understand how it works.
- Develop a vision for how the subsector could function in such a way that it contributes to the project objectives. This involves delineating the boundaries of the system that the project is targeting and outlining specific changes in the system that, together, will lead to it functioning in line with the vision.
- Identify the constraints to the system functioning as desired.
- Outline the extent and nature of changes that can be expected during the life of the project and how to monitor both the changes themselves and the project's contribution to them.
- Develop interventions together with specific market actors that will address the constraints and contribute to changes in the system.
- Implement interventions with market actors, sequencing them so that different types of changes contribute to and reinforce each other.
- Monitor the expected system changes and the functioning of the system as a whole with respect to the project aims, to identify what is and is not changing, how and why.
- Assess the contribution of the project and other factors to the observed changes.
- Reflect on progress and replan, adjusting the subsector vision, strategy, expectations and interventions as needed to maximize system change that will underpin achievement of the project goal.

Figure 17: Iterative process that underpins facilitating system change



⁶³ See for example, USAID (2014) [A Framework for Inclusive Market Systems Development](#), USAID (2016) [Guidelines for Monitoring, Evaluation and Learning in Market Systems Development](#), USAID Feed the Future (2023) [Practitioners' Guidance to Assessing System Change](#), Springfield Centre (2015) [The Operational Guide for the Marking Markets Work for the Poor \(M4P\) Approach](#), BEAM Exchange [Guidance](#), Posthumus et al. (2020) [A Pragmatic Approach to Assessing System Change](#).

Positive system change takes time, particularly when there are multiple barriers to progress, as there are in the Cambodian horticulture sector. It is instructive that the substitution of local for imported vegetables is a long-term trend to which Harvest II is contributing. The production of vegetables in Cambodia has taken off since 2016 with an increase of 1.8 times from 2015 to 2020.⁶⁴ However, the foundation for this increase in production was established before 2015, with the development and promotion of technologies such as drip irrigation and nethouses, as well as the provision of training to farmers on good agricultural practices, funded, in part, by USAID through the Horticulture Innovation Lab and Harvest I. Harvest II was able to build on this foundation, increasing the scale, sustainability and resilience of changes started before the project and catalyzing additional changes, such as improved relationships between producers and buyers, that contributed to accelerating system change. Continuing work in vegetables would enable Harvest III to further contribute to system change.

The barriers to the envisioned system changes in tree crops are more significant than those in vegetables. Thus, a long-term approach is required to enable sustained and scaled direct exports of tree crops that are resilient to shocks. Harvest II worked in many of the key areas required to improve competitiveness, inclusion and resilience in Cambodian tree crops. Given the barriers to progress, the contribution of some of this work to future system changes may not yet be obvious. Nevertheless, as discussed above, many of the changes to which Harvest II contributed are increasing the potential for significant system change in the future and provide a foundation for further work.

It will be useful for Harvest III and USAID/Cambodia to discuss realistic time frames for expected system changes, as well as the scaled impacts among firms and farms that are expected to result from system changes. The context of the subsectors targeted will be a key determinant of the speed of change.

⁶⁴ Calculated from: CEIC Data (2021) [Cambodia Production: Short Term Crops: Vegetables](#) and Khmer Times (2021) [Domestic vegetable production increases in 2020](#).

Table 7: Specific suggestions for Harvest III and USAID/Cambodia related to Recommendation I

Who?	What?
Harvest III	<ul style="list-style-type: none"> • Building on progress to date, strengthen an explicit and systematic integration of the iterative MSD process outlined above; an annual cycle is typically appropriate. • Document the subsector analysis, subsector vision, specific desired dimensions of system change, expectations for change within the life of the project, subsector strategy and interventions, to help staff, subcontractors, USAID/Cambodia and other stakeholders to buy in to the vision and approach. • Involve subcontractors more in the iterative MSD process; consider involving other stakeholders in aspects of the process.
USAID/Cambodia	<ul style="list-style-type: none"> • Allow for a longer-term focus on specific subsectors, with the decision to change or add taken with due consideration to the time required to achieve system change. • Support greater accountability for adhering to the MSD process systematically and iteratively by monitoring it and encouraging reporting on these internal activities. • Agree on expected system changes and likely timeframes for MSD activities; discuss and adjust these annually; ensure targets are aligned to support agreed system change aims.

Recommendation 2: More closely align strategy with the subsector context

Work in MSD has shown that a highly customized strategy that responds to the specific trends and constraints in a subsector is more likely to promote system change. MSD projects use several key strategies to promote change, most typically:

- Supporting market actors to improve so that they become examples for others;
- Supporting market actors to fill gaps in the market system where needed functions don't exist or are ineffective;
- Building the capacity of specific types of market actors so that they can improve the efficiency and performance of the overall value chain and/or interact more effectively with other market actors;
- Building relationships, encouraging greater coordination and an improving the flow of information to stimulate desired behavior and performance changes; and
- Supporting public and private market actors to improve the enabling environment for the subsector through new or improved policies, rules, regulations, processes and procedures or the implementation of these, as well as through changes in informal norms.

The nature and mix of these strategies depends on the subsector context. In weaker markets with more barriers, multifaceted and longer-term interventions are needed to enable value chain partners to transform their businesses so that they serve as effective examples and can help to drive system change. At the same time, a wider range of strategies is needed to address the myriad of ‘gaps’ in the functions, capacities, relationships and enabling environment of the subsector. In stronger markets or markets where other powerful factors are encouraging positive system change, a narrower range of more “light touch” interventions may be sufficient to contribute significantly to system change.

The tree crop subsectors in Cambodia face a plethora of competitive challenges. The evaluation indicated that intensive interventions with partners were usually more successful than extensive interventions in enabling firms to become recognized examples. Creating more examples of internationally competitive firms through intensive interventions will be important to contributing to system change in the tree crop subsectors. At the same time, there are many ‘gaps’ in the tree crops subsectors. Both Harvest II and the evaluation found a significant number of areas where market actors’ capacity and relationships are typically not yet strong enough to support sustained direct exports at scale. The Harvest II final report identifies a number of services and workforce improvements essential to transformation in these subsectors with which the evaluation team agrees. Harvest II consultants identified a range of business enabling environment aspects critical to enabling scaled and sustained direct exports of tree crops, particularly related to regulations, organizations and procedures. Harvest III can build on its contribution to system change in the tree crops subsectors by expanding the diversity of its interventions to address a wider array of missing functions, inadequate capacities, weak relationships and ineffective aspects of the enabling environment in the market systems. It is recommended that this include work at the practical, operational level of improving the business enabling environment, which affects the daily lives of farmers and firms. Given the significant challenges in these subsectors, collaborating with, and complementing other development partner and government efforts will be particularly important, as no individual project or institution can effectively address all the constraints needed for transformational change in the tree crop subsectors.

By comparison, the vegetable subsector has fewer competitive challenges and momentum in positive system change. In this subsector, the evaluation found that both intensive and extensive interventions were effective in contributing to system change. Some gaps in the market system remain, such as cold-chain transport and regulations regarding pesticide residues in imported vegetables. Addressing these persistent gaps will likely require intensive interventions. There are opportunities for Harvest III to build on the progress in system change from Harvest II, through targeted interventions that address continuing gaps and complement the activities of other projects.

Because many factors constantly affect the competitiveness and inclusivity of sectors and it is not possible to identify all barriers at the start of a project, it is important that MSD projects have flexibility to adjust their strategy during implementation to most effectively achieve an agreed vision for system change. This may mean a project adds new areas of work, such as supporting firms to start up enterprises that fill ‘gaps’ in a sector, addressing new areas of the business enabling environment or initiating new ways to facilitate investments. It can also mean that the project starts to work with firms in different ways, for example providing more capacity building to firms in parts of the value chain that are weak or reducing the provision of information as market actors increasingly take over this function.

With respect to Harvest III specifically, it will be useful for the team and USAID/Cambodia to agree on the system changes expected by the end of the project and then annually discuss and agree on strategy shifts that will most effectively promote those changes. It will be important to be open to work on critical barriers found, such as regulations and procedures in the business enabling environment. In addition, there are several measures that USAID/Cambodia can take to enable flexibility in Harvest III. Targets can be agreed for the life of the project rather than annually, enabling the team to sequence interventions more intentionally to progressively address specific barriers to longer-term competitiveness and inclusion. While being accountable for implementing a clear gender strategy is critical, targets for household outreach may be more appropriate than targets for female and male farmers in the Cambodian context. USAID/Cambodia can allow budget flexibility to shift resources across activities and line items, ensuring that resources are constantly deployed as efficiently as possible to achieve the project’s aims in an evolving context.

Table 8: Specific suggestions for Harvest III and USAID/Cambodia related to Recommendation 2

Who?	What?
Harvest III	<ul style="list-style-type: none"> • Increase the customization of the strategy for each subsector to the context of that subsector, considering the intensity and diversity of interventions as well as the activities of other projects, development partners and institutions. • Ensure that the strategy considers all the changes in the subsector required to achieve the vision. • Recognize that system change will take longer in weaker subsectors than in stronger ones and outline expectations for system change and targets accordingly.
USAID/Cambodia	<ul style="list-style-type: none"> • Adjust expectations per subsector depending on the strength and momentum in the subsector, recognizing that not all required changes will necessarily benefit target groups within the life of the activity, particularly in weaker subsectors. • Provide additional flexibility to MSD activities to allow them to address the range of constraints needed to achieve an agreed expectation for system change. • When working in weaker subsectors, ensure successive activities are guided by a realistic but long-term vision of system change.

Recommendation 3: Explicitly address structural barriers to inclusion

The evaluation identified several issues related to inclusion. First, there is a danger in the tree crop subsectors, and the vegetable subsector to a lesser degree, that larger firms will increasingly dominate. Many firms are already starting or expanding their own farms, which may reduce or limit interaction with smallholder farmers. This may put smallholder farmers at an increasing disadvantage in serving more profitable markets. At the same time, larger buyers and processors may push smaller firms out. Second, the evaluation found a number of disparities in the influence and control among male and female

farmers. Last, smallholder farmers typically have less power than buyers in tree crops at the moment, due to the current demand/supply situation.

Lessons from other projects indicate that effectively addressing inclusion requires:

- a customized vision for an inclusive subsector agreed by the development partner and implementer,
- efforts to understand and, then, address structural barriers to that vision, and
- integration of inclusion into the strategy and interventions for each subsector.

The customized vision should include the expectations for how disadvantaged groups will participate in and benefit from their market engagement differently from the way they do now. The strategy explains what changes are needed so that disadvantaged groups can participate and benefit in the way envisioned and how the project will facilitate those changes. The strategy is based on an understanding of the barriers to changes. For example, it is important to understand why female farmers report they are less able to influence the vegetable value chain compared to what male farmers report. The strategy should, then, outline how to address the specific barriers for women underpinning this finding and the vision should outline expected changes that enable women at scale to have a greater influence than they do now on the vegetable value chain.

With respect to the inclusion of smallholder farmers and small firms, it will be useful to get a better understanding of the relative roles and competitive positions of smallholder and large farms, as well as small firms and large firms. It will also be useful to understand the trends in sourcing and selling by size of operation. Using this information, Harvest III can then realistically envision how smallholder farmers and small firms can participate in, contribute to and benefit from tree crop or vegetable production in the future. The project team can then assess the barriers to that type of participation and benefit, and decide how the project can work with market actors to address them.

Harvest II proactively identified and worked with women and youth entrepreneurs, supporting them to improve and expand their businesses. This approach has resulted in a number of these businesses becoming examples of success in terms of both firm competitiveness and inclusion. Having visible examples is an important contributor to system change. Harvest III can further enhance inclusion by more systematically addressing structural barriers to inclusion.

The Harvest II Gender Action Plan outlines structural constraints to inclusion of gender and youth in horticulture in 2017. This provides a good starting point for further integrating inclusion into the Harvest III strategy. Updates and more specificity per subsector will be useful to thoroughly integrate inclusion into the vision for each subsector, as well as to augment ways to address the structural barriers to inclusion in the strategy and interventions for each subsector. For example, if Harvest III finds that women are more reluctant to make investments in vegetable production technologies compared to men, then the team could brainstorm approaches to addressing that, such as:

- working with buyers on risk sharing arrangements with farmers for technology purchases, with the incentive that women are reliable suppliers and, therefore, the arrangements would benefit the buyers and the farmers; or

- working with financial institutions on developing financial products with greater risk management for women farmers, with the incentive that more risk management would encourage women to invest.

Harvest II employed some strategies that positively contributed to determinants of power balance between farmers and buyers in the tree crops subsectors: long-term relationships between farmers and buyers, mutual investment in meeting demand, farmer certification and farmer collective action. Continued and intensified use of these strategies can help to improve the power balance in the tree crops subsectors.

A useful resource for gender inclusion specifically is [The WEAMS framework: women’s empowerment and market systems concepts](#).

Table 9: Specific suggestions for Harvest III and USAID/Cambodia related to Recommendation 3

Who?	What?
Harvest III	<ul style="list-style-type: none"> • Update assessments of the trends and barriers to inclusion, incorporating farm/firm size as well as gender and age. • Integrate approaches to addressing the structural barriers to inclusion more systematically into strategies and interventions and develop targeted interventions on inclusion when needed. • Facilitate additional support for smallholder farmers and small firms based on the barriers to them participating more effectively in value chains. • Intensify efforts to address power imbalances between smallholder farmers and buyers in tree crops using approaches that have proved successful in Harvest II (mentioned above).
USAID/Cambodia	<ul style="list-style-type: none"> • Encourage broadening of current approaches to inclusion to increasingly address structural barriers to more effective and beneficial participation in subsectors. • Drive consensus with MSD activities on a vision for each subsector that incorporates inclusion, and further encourage specific strategies to address that. • Widen the definition of inclusion to address smallholder farmers and small firms in horticulture subsectors, as well as persistent power imbalances.

Recommendation 4: Increase the focus on building resilience

The evaluation found that shocks are resulting in frequent and significant setbacks for all market actors, as well as the subsectors as a whole, undermining overall progress. Resilience at the farm level is also fundamental to ensuring farmers benefit from project interventions. It can be expected that the frequency and intensity of shocks related to climate change will increase. In addition, it is likely that price volatility and economic shocks will continue, if not increase in the future. System change that results in

sustained and scaled benefits for farmers and firms is unlikely to be possible without further increasing resilience.

There were significant shocks during the project period, to which Harvest II responded strongly. The project's work with tree crop firms during the COVID 19 pandemic, in particular, likely enabled some firms to survive where they might not have otherwise and, thus, contributed to farmers being able to sell crops that otherwise would have been wasted, with commensurate income losses. Harvest III and USAID can build on their work by expanding approaches to increase the resilience of firms, farms and subsectors. The evaluation points to five approaches with promise, many of which Harvest II used:

- **Techniques and technologies:** Crop failure due to extreme weather is becoming more common. Specific techniques and technologies can help to mitigate climate shocks, such as crop diversification, soil conservation, pest management, improved irrigation systems and nethouses. Harvest II promoted these techniques and technologies with positive results.
- **Information:** To mitigate climate related shocks, farmers and firms need access to information, particularly accurate weather forecasts and advice / extension services to address specific challenges. Harvest II promoted and expanded sources of information. These efforts can be further expanded with a focus on social media including Facebook, Telegram, Tik Tok and YouTube which are the most popular information sources for farmers in Cambodia, particularly smartphone users. For example, short educational clips from reputable sources, such as MAFF and strong cooperative unions, through these channels can provide accurate information to an increased number of farmers.
- **Risk management services:** Insurance and financial products designed to help recovery from shocks have been an important complement to other risk mitigation efforts in agriculture in other countries. These types of services are nascent in Cambodia and could help firms and farmers recover more quickly and completely from shocks.
- **Explicit risk planning among market actors:** Some relationships facilitated by Harvest II were derailed by shocks. Explicitly integrating discussions about shocks and risk management into relationship building can strengthen relationships and make them more resilient to future shocks.
- **Research, development and planning:** Climate change will have an increasingly profound effect on horticulture over the coming years. A long-term perspective is important to enable market actors and subsectors to adjust. Research and planning, for example on crop varieties and zoning is underway in neighboring countries but appears to be at an earlier stage in Cambodia. USAID could contribute to longer-term strategic research on climate change adaptation in areas such as crops zoning, vulnerability of crops to different climate stresses, resilient crop varieties and other solutions to help farmers and firms adapt. This contribution could be in the context of a national, regional or global effort.

A guidance document that may be useful is USAID's [Guidance for Assessing Resilience in Market Systems](#).

Table 10: Specific suggestions for Harvest III and USAID/Cambodia related to Recommendation 4

Who?	What?
Harvest III	<ul style="list-style-type: none"> • Expand and intensify work on resilience for firms and farms using successful approaches from Harvest II including the promotion of appropriate techniques and technologies and wider dissemination of information. • Consider increasing interventions to develop and expand risk management services relevant to horticulture farmers and firms. • Explicitly integrate risk planning into all relationship building efforts.
USAID/Cambodia	<ul style="list-style-type: none"> • Expanding on guidance to date, further encourage subsector visions and strategies for MSD activities that incorporate resilience, addressing the risks specific to targeted subsectors. • Consider a longer-term effort to contribute to strategic research, development and planning on climate change adaptation in Cambodia, potentially in the context of a wider regional or global effort.

Recommendation 5: Enhance monitoring and adaptive management

Harvest II has detailed, quantitative baseline and monitoring information. In addition, Harvest II was very responsive to changes in the overall context of the horticulture sector, particularly during the pandemic, and used lessons to adapt the project during implementation. Harvest III could further enhance monitoring and adaptive management with more systematic qualitative information gathering, monitoring system changes and internal reviews with staff, long-term consultants and implementing partners to feed findings and lessons into subsector strategies and interventions.

Systematically gathering qualitative information as part of monitoring is a powerful tool for identifying which new practices, business models and changes in value chain functions are effectively contributing to the envisioned system change and why some interventions are working better than others. This information is essential to adaptive management. Complementing its extensive quantitative information with enhanced qualitative monitoring and documentation of qualitative findings would provide Harvest III with more information to inform which strategies and interventions to expand and which to change or drop. It would also provide additional, valuable information to share with partners to help them achieve their particular aims within subsectors.

MSD projects are finding that regularly monitoring system changes, including specific envisioned changes and broader dimensions of system change, such as inclusion and resilience, as well as assessing the contribution of the project to those changes, provides very useful information to adapt project strategies. Figure 18 illustrates that assessing system change can inform the cycle of adaptive management that underpins successful MSD projects.⁶⁵ For Harvest III, regular assessments of system

⁶⁵ Adapted from USAID Feed the Future (2023) [Practitioners' Guidance to Assessing Systems Change](#).

change could investigate the specific system changes the project targets and the dimensions of system change related to competitiveness, inclusion and resilience such as those addressed in this evaluation.

A useful resource is the [USAID Feed the Future Practitioners' Guidance to Assessing Systems Change](#).

Figure 18: Assessing system change informs the MSD project cycle



Table 11: specific suggestions for Harvest III and USAID/Cambodia related to Recommendation 5

Who?	What?
Harvest III	<ul style="list-style-type: none"> • Refine the monitoring and results measurement system to enhance qualitative information collection and include regular assessment of system change using relevant dimensions. • Enhance the system for internal reviews and adaptive management, incorporating greater participation of staff, long-term consultants, implementing partners and other relevant stakeholders.
USAID/Cambodia	<ul style="list-style-type: none"> • Leveraging existing processes, structure annual dialogues on strategies and targets after the annual internal reviews in MSD activities. • In addition to the disaggregation of quantitative results, require qualitative reporting on progress towards system change, particularly inclusion and resilience. • Further build flexibility for MSD activities to respond robustly to findings from monitoring and assessment of system change.

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