

<u>CODES PROJECT</u> COMMERCIAL DEVELOPMENT AND STRENGTHENING OF HORTICULTURE

## MID-POINT EVALUATION REPORT Conducted DECEMBER 2016 through JANUARY 2017



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## ABREVIATIONS, DEFINITIONS, AND ACRONYMS

АСНА	Angkor Community Heritage and Economic Advancement Project
ADD or A.D.D.	Activity Design Document
Adoptive farmer	Farmers who have adopted various levels of CODES-promoted inputs and know-how
Fertigation	The efficient practice of applying water-soluble fertilizers through drip irrigation systems
GFA	Grant Funding Agreement
HCD	Human Centered Design
HI-VALUE	CODES Component-1 high-value crop farmer
HORT	CODES Component-2 traditional farmers in transition to commercial horticulture
kg/m²	kilograms per square meter
MASC	Melon Association Siem Reap Meanchey
M&E	Monitoring and Evaluation
m²	Square meter
MFI	Micro Finance Institution
NZD	New Zealand Dollar
PDA	Provincial Department of Agriculture
PPE	Personal Protective Equipment

#### **CODES ORGANIZATION UPDATE AS OF 31-DECEMBER-2016**

- 1. CODES finance function reported directly to Finance Director in Phnom Penh as a Financial Best Practice.
- 2. M&E function reported to CADF Director, not to CODES Project Manager, as an M&E Best Practice.
- 3. Output-6 (Access to Credit) and Output-7 (Access to Inputs) Facilitator was re-assigned in Year-3 (JUL-2016), due to budget problems associated with weakness of the NZD. Output-6 and Output-7 activities were absorbed into other Outputs as planned.
- 4. Consultant Stuart Brown was replaced by part-time Agronomy Advisor, Dr. SENG Kim Hian.



ACKNOWLEDGEMENT IS MADE OF THE CONTRIBUTION OF THE PLANT & FOOD RESEARCH TEAM TO CODES PROJECT



RESULTS DIAGRAM – FOCUS ON SHORT-TERM OUTCOMES RESULTS MEASUREMENT TABLES – COMPONENT-1 & COMPONENT-2

> BITTER GOURD IS A FAIRLY POPULAR ITEM IN CAMBODIAN COOKING. HERE IT IS BEING GROWN USING AN IMPROVED TRELLIS SYSTEM, PLASTIC MULCHING FILM, AND DRIP IRRIGATION. THIS WILL RESULT IN MUCH HIGHER PRODUCTIVITY COMPARED TO THE TRADITIONAL GROWING TECHNIQUE.

## **RESULTS DIAGRAM - FOCUS ON SHORT-TERM OUTCOMES**

#### THE A.D.D. DEFINED "SHORT-TERM OUTCOMES" AS THE PROJECT MID-POINT



- 5. Training in efficacy / health & safety / environmental aspects of agrochemicals, i.e. fertilisers and pesticides, for all farmers.
- 6. Access to credit for all farmers.
- 7. Access to agricultural inputs for all farmers, via District- and Commune-level input suppliers and related Private Sector Partnerships.

Component-1: High-value horticultural enterprise by the more highly motivated and skilled farmers.											
Short-Term Outcomes Desired (from Results Diagram)	Indicator(s)	Baseline Information and Targets at End of Project	Measurement Against Targets at Mid-Point	Methodology / Data Sources							
		<ul> <li>Baseline will be conducted when the high-value crop farmers have been selected.</li> </ul>	<ul> <li>Farmer selection was on a 'rolling' basis, almost until mid-point, therefore, no baseline was able to be conducted.</li> </ul>	Awareness-raising meetings; farmer selection.							
<ul> <li>Significant and measurable adoption of high-value crop production by the more highly motivated and skilled farmers.</li> </ul>	<ul> <li>Number of farmers adopting high-value crop production with measurable increase in income.</li> </ul>	<ul> <li>Target: At least 500 farmers adopt high-value crops production by end of project. [Note: There is no specific income target until end of project, which is \$1,500 yearly increase in profit.] Baseline: \$1,400 yearly profit.</li> </ul>	<ul> <li>631 farmers trained, 43% women. 277 farms growing high-value crops, 23% women-headed. A random sample of 62 Record Books (out of a total of 277) indicated increased profit (over \$1,400 baseline) of:         <ol> <li>\$5,197 average increase, and</li> <li>\$4,468 median increase.</li> </ol> </li> </ul>	<ul> <li>Survey of 107 high-value crop farmers. Training logs. Farmer Record Books.</li> <li>Baseline imputed from CADF2 and AVAil <u>end-points</u>.</li> </ul>							
<ul> <li>Farmer organisation, crop aggregation, and marketing models established for high-value crops.</li> </ul>	<ul> <li>Non-conventional market system for high-value crops developed and operational.</li> </ul>	<ul> <li>Target: Non-conventional market system for "at least 5-10" high-value crops is operational.</li> </ul>	<ul> <li>Two non-conventional marketing models developed:</li> <li>1. "Niche market" crops sold through the Melon Association.</li> <li>2. "Common market" crops sold through localized aggregation points.</li> </ul>	<ul> <li>Report on selection of high- value crops and market system model.</li> </ul>							
<ul> <li>Farm safety and environment improving via safe use of agrochemicals.</li> </ul>	<ul> <li>Percent of farmers associated with high-value crops apply safe practices of agrochemical use.</li> </ul>	• Target: 50% of high-value crop farmers apply safe use of agrochemicals. Baseline: Assumed to be 0.	• 64% of high-value farmers claim to apply safe use of agrochemicals; 57% adhere to withholding period; 62% properly wash backpack sprayer.	<ul> <li>Survey of 107 high-value crop farmers.</li> </ul>							
<ul> <li>Improved access to credit and production inputs for high value crop farmers.</li> </ul>	<ul> <li>Number of farmers accessing credit from MFIs.</li> </ul>	<ul> <li>Target: At least 15% of farmers access credit from associated MFIs for horticulture production.</li> <li>Baseline: <ol> <li>CADF2 end-point = 25%.</li> <li>AVAiL end-point = 55%.</li> </ol> </li> </ul>	<ul> <li>52% of high-value farmers accessed credit from CODES partner MFIs. 21% accessed credit from banks, and 6% from savings groups.</li> </ul>	<ul> <li>Survey of 107 high-value crop farmers.</li> </ul>							
	<ul> <li>'Tool kit' of inputs available nearby to high-value crop farmers in target communes.</li> </ul>	<ul> <li>Target: At least 6 out of a list of 9 inputs available in 80% of all target areas.</li> <li>Baseline: AVAiL end-point = 76%.</li> </ul>	<ul> <li>At least 8 out of list of 9 'tool kit' inputs available at all local input supply shops surveyed. [Note: The 'tool kit' has now grown to 18 items. See Output-7.]</li> </ul>	<ul> <li>Survey of 25 local input suppliers.</li> </ul>							

## **RESULTS MEASUREMENT TABLE – COMPONENT-2**

omponent-2: Transformation to commercial horticulture by traditional farmers benefitting from basic training by food security projects, proximity to newly paved roads, and/or improved input supply.										
Short-Term Outcomes Desired (from Results Diagram)	Indicator(s)	Baseline Information and Targets at End of Project	Measurement Against Targets at Mid-Point	Methodology / Data Sources						
		<ul> <li>Baseline to be conducted at beginning of project implementation.</li> </ul>	Published 09-SEP-2015.	Baseline survey.						
<ul> <li>Significant and measurable adoption of production inputs / technologies and market initiatives.</li> </ul>	<ul> <li>Number of farmers associated with commercial horticulture production with measurable increase in income.</li> </ul>	<ul> <li>3,000 farmers. [Note: There is no specific income target until end of project, which is \$500 increased profit over baseline.]</li> </ul>	<ul> <li>1,540 farmers trained, 37% women, 1,306 adopting commercial inputs, 39% women. Sample of 230 adoptive farmers' Record Books (out of total of 259, minus extreme cases) indicated increased profit (over \$387 baseline) of:</li> <li>1. \$789 average increase, and,</li> <li>2. \$748 median increase.</li> <li>[Note: it is difficult to get newly trained farmers to keep record books, compared to experienced high-value crop farmers in Component-1.]</li> </ul>	Training logs. Survey of 225 commercial horticulture farmers. Farmer Record Books.						
<ul> <li>Increased production and marketing skills in commercial vegetable production.</li> </ul>	<ul> <li>Percentage of associated farmers adopted the promoted inputs and technologies for increased production and productivity.</li> </ul>	<ul> <li>Target: 60% usage of at least 5 key production inputs/techniques.</li> <li>Baseline: 12% usage of key inputs.</li> </ul>	<ul> <li>225 commercial horticulture farmers surveyed indicated 98% adoption of branded seeds; 98% chemical pesticides; 96% chemical fertilizers; 87% raised bed cultivation; 44% improved trellising; and 44% micro-irrigation.</li> </ul>	Survey of 225 commercial horticulture farmers.						
	<ul> <li>Percentage of associated farmers increased in knowledge and skill in commercial horticulture production.</li> </ul>	<ul> <li>Target: 70% of farmers increased in knowledge and skill in commercial horticulture production.</li> <li>Baseline: 37% of farmers attended various NGO vegetable trainings.</li> </ul>	<ul> <li>73% of farmers reported increased knowledge and skill in commercial horticulture production.</li> </ul>	Survey of 225 commercial horticulture farmers.						
	<ul> <li>Percentage of associated farmers increased in knowledge and skill in commercial horticulture marketing.</li> </ul>	<ul> <li>Target: 70% of farmers increased in knowledge and skill in commercial horticulture marketing.</li> </ul>	<ul> <li>79 % of farmers increased in knowledge and skill in commercial horticulture marketing.</li> </ul>	<ul> <li>Survey of 225 commercial horticulture farmers.</li> </ul>						
	<ul> <li>Percentage of associated farmers adopting at least 4 out of 6 parameters indicating pre-and post-harvest handling.</li> </ul>	<ul> <li>Target: 70% of farmers adopted pre- and post-harvest handling practices.</li> <li>Baseline: 7% use pre- and post-harvest handling practices.</li> </ul>	<ul> <li>74 % of farmers reported adoption of pre- and post-harvest handling practices.</li> </ul>	<ul> <li>Survey of 225 commercial horticulture farmers.</li> </ul>						

(Table continued on next page)

## **RESULTS MEASUREMENT TABLE – COMPONENT-2 (continued)**

	Short-Term Outcomes Desired (from Results Diagram)		Indicators		Baseline Information and Targets at End of Project		Measurement Against Targets at Mid-Point		Methodology / Data Sources
•	Improved farm safety and environment via safe use of agrochemicals.	Percer associ horticu safe ut	ntage of farmers ated with commercial Ilture production applying se of agrochemicals.	•	Target: 50% of farmers apply safe use of agrochemicals (protective gear, correct chemicals, avoiding overuse, implementing proper cleanout of pesticides and fertilizers. Baseline: 4% apply safe practices.	•	<ul> <li>56 % of farmers reported applying safe use of agrochemicals;</li> <li>62% proper washing sprayer;</li> <li>42% adhere to withholding period.</li> </ul>	•	Survey of 225 commercial horticulture farmers.
•	Improved access to credit, inputs, and markets for all farmers.	<ul> <li>Number credit.</li> </ul>	er of farmers accessing	•	Target: At least 15% of farmers accessing credit from associated MFIs for horticulture production. Baseline: 28% access credit.	•	41% of farmers accessed credit; 18% from CODES partner MFIs; 11% from banks; 6% from relatives.	•	Survey of 225 commercial horticulture farmers.
		Number inputs horticute	er of promoted and quality available for commercial Ilture farmers.	•	Target: At least 6 out of a list of 9 inputs available in 80% of all target areas.	•	At least 8 out of a list of 9 'tool kit' inputs available at all local input supply shops surveyed. [Note: The 'tool kit' has now grown to 18 items. See Output-7.]	•	Survey of 25 local input suppliers.

NEAR THE MID-POINT, CODES STARTED WORKING IN ANGKOR PARK WITH THE ACHA PROJECT, ALSO FUNDED BY NEW ZEALAND AID PROGRAMME.

LOW YIELD CUCUMBERS BEING GROWN IN ANGKOR PARK USING TRADITIONAL METHODS. ACHA PROJECT CUCUMBERS BEING GROWN WITH IMPROVED SEEDS, TRELLISING, PLASTIC MULCHING FILM, DRIP IRRIGATION, AND 'FERTIGATION'.



OBJECTIVES TOOLS METHODOLOGIES

HYBRID MELONS WERE CADF'S FIRST ENTRY INTO HIGH-VALUE CROP PRODUCTION. FAVOURABLE RESULTS LED TO CODES PROJECT'S HIGH-VALUE CROP COMPONENT, SEEKING HIGHER-THAN-AVERAGE FINANCIAL RETURNS FOR EXPERIENCED, SMALL-SCALE COMMERCIAL FARMERS.

## **EVALUATION OBJECTIVES**

The purposes of the Mid-Point Evaluation were:

- 1. To measure project progress against its indicators and targets as stated in the Results Diagram and the Results Measurement Table.
- 2. To measure other significant impacts, such as change in family assets, decrease in migration, education of children.
- 3. Although not required by the GFA, this evaluation was conducted in the interest of management Best Practice; donor and iDE headquarters communication; and transparency.

## **EVALUATION TOOLS**

The Mid-Point Evaluation was carried out by the M&E team, with support from the CODES Facilitators and Field Technicians. Effort was made to ensure objectivity throughout the process. Tools used included:

- Desk Review
- Household Survey
- Record Book Analysis
- Focus Group Discussions
- Survey of Input Suppliers
- Survey of Collectors
- Government Informant Interviews
- 'Most Significant Change' Cases

ASPARAGUS SEEDLINGS GROWING IN TRAYS UNDER CONTROLLED CONDITIONS TO LIMIT LOSS AND GET A HEAD-START ON PLANTING. THE 'JURY IS STILL OUT', BUT ASPARAGUS IS A HIGH POTENTIAL HI-VALUE CROP FOR SUPERMARKETS AND TOURISM RESTAURANTS.

#### HOUSEHOLD SURVEY

CADE

The main instrument for quantitative data collection. 332 'inputadoptive farmers' were interviewed using a 12-page questionnaire.

# SAME

SAME

Relevant project documents were reviewed including the ADD, GFA, Annual Reports, Baseline Survey, Work Plans, and Quarterly Reports.

#### SURVEY OF INPUT SUPPLIERS



25 agricultural input suppliers were surveyed using a questionnaire to gather information related to access to agricultural inputs, business development, and embedded services, such as providing advice to customers, and extending input credit.

#### FOCUS GROUP DISCUSSIONS

Seven Focus Group discussions were conducted with Component-2 input-adoptive farmers and Component-1 melon association members.



#### **KEY INFORMANT INTERVIEWS**

Interviews were held with 7 agricultural officers from provincial departments of agriculture, and with 15 village chiefs, to determine local government perceptions of codes project.



#### FARMER RECORD BOOK ANALYSIS

- 292 Record Books—out of a total of 536—were randomly collected and analyzed for measuring the annual increase in profit and productivity of HI-VALUE and HORTadoptive farmers.
- About 30% of sampled famers who kept record books were duplicated in the Household Survey.
- Debatably, farmers with the motivation to keep record books may be the better farmers. However, other factors certainly come into play, such as literacy, numeracy, cultural behavior, and perceived time available for paperwork.

## NUMBER OF RECORD BOOKS BY CODES COMPONENT

Component-1 HI-VALUE <sup>*</sup> Farmers	62
Component-2 HORT** Farmers:	230
Input Adoption Level 1 (highest)	60
Input Adoption Level 2	30
Input Adoption Level 3	50
Input Adoption Level 4 (lowest)	90
Total (HI-VALUE + HORT Farmers)	292
	11 - 1 - 11

\* "HORT" refers to those farmers from CODES Component-2 in transition from traditional to small-scale commercial horticulture.

\*\* "HI-VALUE" refers to those farmers from CODES Component-1 who are already experienced small-scale commercial farmers, but learning how to further increase income by growing selected HI-VALUE crops.

## **EVALUATION METHODOLOGIES**

PLASTIC MULCHING FILM AND RAISED BED PRODUCTION ARE A KEY INPUT AND TECHNIQUE PROMOTED BY CODES FOR WATER MANAGEMENT IN BOTH THE RAINY AND DRY SEASONS.

#### • INTERVIEWEE SELECTION CRITERIA:

Interviewees were randomly selected from the CODES Adoptive Client List, which categorizes farmers into four levels of adoption of inputs and knowhow. Farmers who have received training, but not yet adopted any CODESpromoted inputs or know-how, were not included in the survey .

#### SAMPLE SIZE:

Sample size was selected to give a 95% Confidence Interval, 5% Margin of Error, and 50% Response Distribution. The minimum sample size was 332 adoptive farmers, of which 225 were farmers transitioning to commercial horticulture (HORT), and 107 were experienced high-value (HI-VALUE) crop farmers. A web-based Sample Size Calculator available from Raosoft (http://www.raosoft.com/samplesize.html) was used.

 WORKPLAN: See ANNEX 2 for M&E data collection and reporting schedule.

Interviewed Farmers	Siem Reap	Banteay Meanchey	Otdar Meanchey	Total
HORT	50	119	56	225
HI-VALUE	46	23	38	107
		1/5-1	TOTAL	332

¥4.

## **EVALUATION SCHEDULE**

	TIME FRAME																
ACTIVITIES		DEC	C-16			JAN	-17	-		FEE	8-17			MA	R-17	,	RESPONSIBLE PERSONS
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
1-DATA GATHERING	<u> </u>																
Meeting with project staff to discuss role and responsibilities																	
undertaking M&F Mid-Point																	CODES Project ream
Desk Review																	M&E Team
Survey of Input Suppliers.																	M&E Team
Key Informant Interview with Village Chiefs																	M&E Team
Key Informant Interview with Provincial Departments of Agriculture.																	M&E Team
Focus Group Discussion with HORT and HI-VALUE farmers.																	M&E Team
Focus Group Discussion with Melon Association members and leaders.																	M&E Team
Most Significant Change stories with HORT and Hi-Value farmers.																	M&E Team
Most Significant Change story with collectors and wholesalers.																	M&E Team
Household Survey for HORT and HI-VALUE farmers.																	M&E Team and CODES Field Technicians
Survey vegetable collectors and wholesalers.																	Commercial Horticulture Marketing Assistants
Collected Most Significant Change stories.																	M&E Team
2-DATA ENTERY AND ANALYSIS																	
Data entry, cleaning and analysis of quantitative data.																	M&E Team
Data entry and analysis of qualitative data.																	M&E Team
3- WRITING MID-POINT EVALUATION REPORT																	
Drafting M&E Mid-Point Report.																	M&E Team
Editing, finalization, and approval of M&E Mid-Point Report (delayed until end-April).																	CODES Project Manager and CADF Director

#### **HI-VALUE CROP FARMERS**



### HORT FARMERS

CODES TRANSFORMS TRADITIONAL HORTICULTURALISTS—MAINLY NEW TO THE CADF APPROACH—TO COMMERCIAL FARMING BY BUILDING UPON THE NON-SUSTAINABLE ACTIVITIES OF FOOD SECURITY PROJECTS IN OUR TARGET PROVINCES; UPON THE IMPROVING ACCESS TO INPUT SUPPLY; AND UPON THE MARKET ACCESS AFFORDED BY NEWLY PAVED ROADS.



**OUTPUT-1: IDENTIFICATION OF:** 

- CLIMATE-APPROPRIATE HIGH-VALUE CROPS, AND MARKETS;
- FARMERS AND FARMER-CLUSTERS WHO CAN BE ORGANISED AND INTEGRATED INTO HIGH-VALUE ENTERPRISE; A SUSTAINABLE, COMMERCIAL ORGANISATIONAL MODEL [i.e. MARKET SYSTEM MODEL].

NOTE: THIS IS AN OUTPUT SPECIFIC TO COMPONENT-1 (HIGH-VALUE HORTICULTURAL ENTERPRISE BY THE MORE HIGHLY MOTIVATED AND SKILLED FARMERS). THIS OUTPUT HAS BEEN COMPLETED.



## **RESULTS MEASUREMENT TABLE – OUTPUT-1**

#### Outputs specific to Component-1 (refer to Results Diagram).

**Output-1: Identification of:** 

- climate-appropriate high-value crops, and markets;
- farmers and farmer-clusters who can be organised and integrated into high-value enterprise;
- a sustainable, commercial organisational model [i.e. market system model].

Note: This Output has been completed.

Indicators	Targets at End of Project	Measurement Against Targets at Mid-Point	Methodology / Data Sources
<ul> <li>Number of farmers identified and integrated into high-value crop enterprise.</li> </ul>	• 500 high-value crop farmers (50% ♀).	• 813 farmers (51% female) identified for integrating into high- value crop enterprise. 277 integrated to date.	Awareness raising and training logs.
<ul> <li>Number of marketable and climate- appropriate high-value crops identified (through a market survey) for promotion of high-value crop enterprises in project areas.</li> </ul>	<ul> <li>At least 5-10 high-value crops identified and promoted.</li> </ul>	<ul> <li>10 marketable and climate appropriate high-value crops identified and are being trialled and promoted: <ol> <li>Sweet melon</li> <li>Cherry tomato</li> <li>Asparagus</li> <li>Sweet pepper</li> <li>Broccoli</li> <li>Spring onion</li> <li>Hot chilli</li> <li>Cauliflower (off-season)</li> <li>Tomato (off-season)</li> </ol> </li> </ul>	• Reports on (1) agronomic and market research, and on (2) selection of high- value crops and marketing system model.
<ul> <li>An innovative approach to sustainably organising clustered farmers to enjoy the benefits of high-value crops identified.</li> </ul>	<ul> <li>An organisational model / approach to facilitate more effective "high-value crop" market access for farmers and agribusinesses.</li> </ul>	<ul> <li>Two non-conventional marketing approaches developed:</li> <li>1. "Niche market" crops sold through the Melon Ass'n.</li> <li>2. "Common market" crops sold through localized aggregation points.</li> </ul>	iDE Human Centred Design team research. CODES internal market access strategy.

## **ACTIVITY SUMMARY – OUTPUT 1**

A otivition	Target by End of	Ashiound	Dreaters	Participants			
Activities	Project	Achieved	Progress	Total	Female		
Identification of farmers and farmer-clusters who can be organized and integrated into high-value enterprise.	60 Awareness Meetings	60	100%	813	414		
Organizing exposure trips of interested farmers to successful melon producers.	30 Exposure Trips	25	83%	124	62		
Identification of marketable and climate-appropriate high-value crops through conducting market research by project team and a local international consultant.	2 Research Reports	2	100%				
Research on hybrid melon value chain carried out by project team and a contracted consultant.	1 Research Report	1	100%				
Identification of a sustainable, commercial organizational model to facilitate more effective market access for farmers and agribusinesses in the trust-averse Cambodian context.	1 HCD Report	1 HCD Report 1 CODES Report	>100%				
Facilitation of meetings for strengthening existing Vegetable Communities and Enterprise Teams.	10 Meetings & Events	10	100%	179	70		

## REPORTS ON CROPS, MARKETS, FARMERS, ORGANIZATIONAL MODEL

FIELD WORK WAS CONDUCTED, AND REPORTS WRITTEN, ON MARKET AND AGRONOMIC RESEARCH ON HI-VALUE CROPS; ON THE SWEET MELON VALUE CHAIN; ON A FARMER ORGANIZATIONAL MODEL (HUMAN CENTERED DESIGN), AND ON FINAL SELECTION OF HI-VALUE CROPS AND ORGANIZATIONAL MODEL.



## FINAL HI-VALUE CROP SELECTION

TEN HIGHLY MARKETABLE HIGH-VALUE CROPS WERE IDENTIFIED, AND ARE BEING TRIALED AND PROMOTED. THE CROPS ARE FROM SEVERAL FAMILIES, WHICH WILL FACILITATE "CROP ROTATION AS A TECHNOLOGY" WITH THE INCLUSION OF A FEW ADDITIONAL FAMILIES AS A BEST PRACTICE APPROACH.



**Sweet Melon** 



**Cherry Tomato** 



Asparagus



**Sweet Pepper** 



Broccoli



**Spring Onion** 



**Bulb Onion** 



Hot Chili



**Off-Season Cauliflower** 



**Off-Season Tomato** 

MORE EFFORT IS REQUIRED WITH PRIVATE SECTOR PARTNERS FOR SUSTAINABLY SOURCING QUALITY, CLIMATE-APPROPRIATE SEEDS.

## HI-VALUE ORGANIZATIONAL / MARKET SYSTEM MODEL

- 1. ACCESS TO UPSCALE MARKETS THROUGH THE MELON ASSOCIATION, MAINLY BUT NOT EXCLUSIVELY FOR 'NICHE' CROPS TO GROCERS AND SUPERMARKETS.
- 2. ACCESS TO DISTRICT AND COMMUNE 'COMMON' MARKETS THROUGH SELECTED COLLECTORS.









Cauliflower Farmer-Clusters

- OUTPUT-2: TRAINING IN COMMERCIAL HIGH-VALUE HORTICULTURAL PRODUCTION, INCLUDING ACCESS TO NECESSARY HORTICULTURAL INPUTS [see output-7], AND TO CREDIT [see output-6].
- NOTE: THIS IS AN OUTPUT SPECIFIC TO COMPONENT-1 (HIGH-VALUE HORTICULTURAL ENTERPRISE BY THE MORE HIGHLY MOTIVATED AND SKILLED FARMERS).

THE ONION FAMILY IN GENERAL ARE A GOOD, DIVERSE HI CROP FAMILY, INCLUDING BULB ONIONS, SCALLIONS AND BUNCHING ONIONS, SHALLOTS, AND CHIVES.

Output-2:	[raining in commercial high-value horticultural production, including access to necessary horticultural inputs [see Output-7]	,
	and to credit [see Output-6].	

	Indicator		Targets at End of Project		Measurement Against Targets at Mid-Point		Methodology / Data Sources
•	Number of highly skilled and motivated farmers trained in commercial high-value horticultural production and application of new inputs.	•	Target: 500 highly and motivated famers (50% $\bigcirc$ ). [Note: Includes 35 CADF2 sweet melon farmers.]	•	631 farmers trained, including 46% females.	•	Training logs.
•	Number of farmers and relevant project staff receiving training in high-value crop production, including Good Agricultural Practices by NZ consultants.	•	Target: all relevant project staff and selected lead farmers trained.	•	All 7 relevant project staff and 595 farmers (including 35 Training Farm owners) trained in high-value crop production by Plant & Food.	•	Reports from Plant & Food.
•	Number of training farms installed, demonstrating the high-value crop production using modern inputs/techniques and its relative benefits.	•	Target: 30 training farms installed and operational.	•	35 training farms set up.	•	High-value crop farmer list.
•	Number of field days conducted at the training farms, participating by all the associated high-value crop farmers.	•	Target: 70 field days conducted by end of project.	•	26 field days conducted.	•	Training logs.
•	Number of field trainings in high-value crop production conducted by lead farmers implemented.	•	Target: at least 50 field trainings conducted by end of project.	•	14 field trainings conducted.	•	Training logs.
•	Number of exposure trips across the provinces, or to neighbouring countries organized, participating by the selected high-value crop farmers.	•	Target: at least 24 exposure trips organized by end of project.	•	29 exposure trips conducted.	•	Training logs.
•	Number of high-value crop farmer meetings (annually) organized.	•	Target: at least 12 farmers meetings organized by end of project.	•	9 High-Value farmer meetings conducted.	•	Training logs.
•	Number of extension materials (leaflets/brochures) on technical know-how of specific high value crop production and application of new inputs developed and distributed.	•	Target: 1000 leaflets / brochures developed and distributed.	•	No leaflets / brochures distributed. [Note: Several 'crop protocols' from Plant & Food are in translation stage.]	•	Component-1 Facilitators.

## **ACTIVITY SUMMARY – OUTPUT 2**

Activities	Target by End	Achieved	Progress	Participants	
Activities	of Project	Acilieved	Togress	Total	Female
Training in hybrid melon production for motivated and skill farmers.	10 Trainings	13	130%	198	69
Strengthening MASC and High-Value Enterprises for increased production and management capacity.	30 Meetings	15	50%	332	65
Training for high-value crop farmers in application of new inputs and good farming practices.	17 Trainings	29	170%	433	201
Set up of training farms with lead farmers, demonstrating the high-value horticultural production and its economic advantages.	45 Training Farms	35	78%	35	1
Training in training in group management, financial management, marketing, business and production planning.	6 Trainings	4	67%	40	17
Organization of field days on lead farmer demonstration plots.	70 Field Days	26	37%	268	194
Organization of field trainings (farmer to farmer approach) by the selected lead farmers.	50 Field Trainings	14	28%	146	76
Organization of exposure trips to other provinces, or to neighboring countries.	24 Exposure Trips	29	120%	398	166
Organization of farmer meets for sharing issues, experiences and successes related to high-value horticultural production.	12 Farmer Meetings	9	75%	66	28
Development and distribution of extension materials (leaflets, brochures, etc) on technical know-how of specific crop production and application of new inputs.	1,000 Leaflets	None [Note: Several high-value crop protocols from Plant & Food are in translation stage]			ols from

## **ADOPTION OF HIGH-VALUE PRODUCTION**

631 FARMERS RECEIVED TRAINING, WITH 277 FARMS GROWING HIGH-VALUE CROPS, INCLUDING 64 WOMEN-HEADED FARMS. THIS IS 55% OF THE END-PROJECT TARGET OF 500 HIGH-VALUE FARMERS.

> THIS FARMER IS GROWING BROCCOLI AND CAULIFLOWER. BROCCOLI SHOULD STILL BE CONSIDERED TO BE EXPERIMENTAL BECAUSE HEAT-TOLERANT SEEDS, NOT YET READILY AVAILABLE, ARE REQUIRED FOR GOOD RESULTS.

	Number o	of Farmers	Growing	Hi-Value	Crops
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Provinces	Trained Clients	Training Farms	Hi-Value Crop Farmers	Total
Banteay Meanchey	188	09	57	
Otdar Meanchey	314	14	7310//0	<i>L</i> <sub>87</sub>
Siem Reap	129	12	112	124
Total	631	35	242	277

## **INCREASE IN YIELDS OF HIGH-VALUE PRODUCTION**

YIELDS OF HIGH-VALUE CROPS GROWN BY PARTICIPATING FARMERS SUBSTANTIALLY INCREASED WHEN COMPARED TO THE BASELINE. THE INCREASE RESULTED FROM ADOPTION OF IMPROVED FARMING PRACTICES AND NEW INPUTS, INCLUDING HIGH-VALUE CROP PROTOCOLS DEVELOPED WITH AND CONSULTANTS FROM PLANT AND FOOD RESEARCH.

	Sweet Melon	Hot Chili	Tomato	Sweet Pepper
Baseline	2.0 kg/m <sup>2</sup>	0.9 kg/m <sup>2</sup>	1.4 kg/m <sup>2</sup>	2.1 kg/m <sup>2</sup>
Mid-Point	3.2 kg/m <sup>2</sup>	1.9 kg/m²	2.4 kg/m <sup>2</sup>	3.2 kg/m <sup>2</sup>

	Bulb Onion	Spring Onion	Cherry Tomato	Broccoli	Cauliflower
Baseline	2.2 kg/m <sup>2</sup>	0.9 kg/m <sup>2</sup>	No Data	No Data	No Data
Mid-Point	4.0 kg/m <sup>2</sup>	2.4 kg/m <sup>2</sup>	3.5 kg/m <sup>2</sup>	1.2 kg/m <sup>2</sup>	3.2 kg/m <sup>2</sup>

NOTE: THERE IS NO BASELINE DATA ON THE YIELDS OF CHERRY TOMATO, BROCCOLI, AND CAULIFLOWER, BECAUSE FARMERS DID NOT GROW THESE CROPS BEFORE CODES STARTED. BROCCOLI SHOULD STILL BE CONSIDERED EXPERIMENTAL.

## **INCREASE IN ANNUAL PROFIT OF HI-VALUE FARMERS**

CODES TARGETS END-PROJECT ANNUAL INCREASE IN PROFIT OF \$1,500 PER HIGH VALUE CROP FARMER. ANALYSIS OF 62 RECORD BOOKS INDICATED INCREASED PROFIT (OVER THE BASELINE OF \$1,400) OF \$5,197 AVERAGE INCREASE AND \$4,468 MEDIAN INCREASE (MAXIMUM=\$18,642; MINIMUM=\$592). THE INCREASE RESULTED FROM A COMBINATION OF FACTORS:

- GENERALLY HIGHER MARKET PRICES OF HIGH-VALUE CROPS.
- INCREASE IN YIELDS.
- MORE CROP CYCLES CULTIVATED PER YEAR.
- EXPANDED VEGETABLE GROWING AREA.

CAULIFLOWER CAN BE GROWN IN THE OFF-SEASON O FARMS FORTUNATE TO HAVE ADEQUATE DRY SEASON WATER, AND NO FLOODING IN THE WET SEASON.



THE GRAPH, ABOVE, INDICATES THAT OVER 60% OF HIGH-VALUE CROP FARMERS MADE AN ANNUAL INCREASE IN PROFIT OF MORE THAN THE \$1,500 TARGET. 33% MADE AN ANNUAL INCREASE OF \$5,500 OR MORE.

THE KEYS TO ACHIEVING THE BEST RESULTS WERE:

- ADOPTION OF CODES-INTRODUCED INPUTS AND ASSOCIATED KNOW-HOW, LEADING TO INCREASED PRODUCTIVITY.
- SEVERAL PLOTS OF SUITABLE FARM LAND AVAILABLE, WITH GOOD ACCESS TO WATER IN DRY SEASON.
- AVAILABILITY OF LABOUR AND INVESTMENT CAPITAL.
- FARMING EXPERIENCE.
- BETTER MARKET LINKAGES AND APPLICATION OF PRE- AND POST-HARVEST HANDLING, INCLUDING USE OF MARKET INFORMATION AND QUALITY GRADING.

## FOCUS GROUP DISCUSSION – MELON ASSOCIATION

- THE MELON ASSOCIATION SIEM REAP MEANCHEY MEMBERS REPORTED THE ADVANTAGES OF MEMBERSHIP. THEY PERCEIVE A NUMBER OF BENEFITS SUCH AS HAVING MARKETS FOR SELLING MELONS, LEARNING MELON GROWING TECHNIQUES, AND CLOSE RELATIONSHIP WITH OTHER MELON GROWERS.
- THEY CONFIRMED THAT THE MEMBERSHIP HAS INCREASED, BUT RAISED CONCERNS ABOUT THE POSSIBLE LACK OF MARKETS WHEN CODES ENCOURAGES MORE FARMERS TO GROW MELON IN THE FUTURE.
- THE MEMBERS EXPRESSED THEIR APPRECIATION OF CODES FACILITATING A MELON GROWING SCHEDULE, WITH ALL ASSOCIATION MEMBERS HAVING AN EQUAL CHANCE TO GROW AND SELL MELONS.
- MOST ASSOCIATION MEMBERS REPORTED THEIR ANNUAL PROFIT FROM MELON AND OTHER HI-VALUE CROP CULTIVATION IS INCREASING.
- SOME MEMBERS STILL DO NOT UNDERSTAND THE ASSOCIATION'S BY-LAWS, RULES & REGULATIONS.



- OUTPUT-3: TRAINING IN COMMERCIAL HORTICULTURAL PRODUCTION, WITH FOCUS ON MODERN INPUTS, TECHNIQUES, AND WATER MANAGEMENT, AND INCLUDING ACCESS TO NECESSARY HORTICULTURAL INPUTS [see Output-7], AND TO CREDIT [see Output-6].
  - NOTE: THIS IS AN OUTPUT SPECIFIC TO COMPONENT-2 (TRANSFORMATION TO COMMERCIAL HORTICULTURE BY TRADITIONAL FARMERS)

 BITER GOURD HARVESTING, POST-HARVEST HANDLING

 BITER GOURD HARVESTING, POST-HARVEST HANDLING
## **RESULTS MEASUREMENT TABLE – OUTPUT-3**

#### Output specific to Component-2 (refer to Results Diagram).

Output-3: Training in commercial horticultural production, with focus on modern inputs, techniques, and water management, and including access to necessary horticultural inputs [see Output-7], and to credit [see Output-6].

Indicator	Targets at End of Project	Measurement Against Targets at Mid-Point	Methodology / Data Sources
Number of motivated farmers trained in commercial horticultural production and application of new inputs.	• Target: 3,000 motivated farmers (50% ♀).	1,540 farmers trained, 35% female.	CODES training logs.
Number of farmers and relevant project staff receiving training in commercial horticultural production, including Good Agricultural Practices, by NZ consultants.	Target: all relevant project staff and selected lead farmers trained.	<ul> <li>20 project staff and 950 farmers trained by Plant &amp; Food.</li> </ul>	Reports from Plant     & Food Research.
<ul> <li>Number of training farms installed, demonstrating commercial horticultural production using modern inputs / techniques and related benefits.</li> </ul>	<ul> <li>Target: 100 training farms installed and operational.</li> </ul>	<ul> <li>104 training farms, 16 female headed farms.</li> </ul>	Training farm list.
<ul> <li>Number of field days conducted at training farms, with participation by commercial horticulture farmers.</li> </ul>	Target: At least 120 field days.	• 92 field days.	Training logs.
<ul> <li>Number of field trainings in high-value crop production conducted by selected lead farmers.</li> </ul>	Target: At least 75 field trainings.	27 field trainings.	Training logs.
• Number of exposure trips across the provinces, or to neighbouring countries organized, with participation by selected commercial farmers.	Target: At least 24 exposure trips.	13 exposure trips.	Exposure trip logs.
<ul> <li>Number of commercial horticulture meetings (annually) organized with active participation from various actors.</li> </ul>	Target: At least 24 farmer meetings.	11 commercial horticulture meetings.	Facilitator     reporting.
<ul> <li>Number of extension materials (leaflets / brochures) on technical know-how of specific crop production and application of new inputs.</li> </ul>	<ul> <li>Target: 2,000 leaflets / brochures developed and distributed.</li> </ul>	<ul> <li>694 leaflets distributed related to:</li> <li>1. Chemical pesticides.</li> <li>2. Branded seeds.</li> <li>3. Chemical fertilizer usage.</li> </ul>	Distribution lists from Senior Facilitator.

# **ACTIVITY SUMMARY – OUTPUT-3**

ACTIVITIES	TARGET	ACHIEVED	PROGRESS .	PARTICIPANTS		
	END OF PROJECT			TOTAL	FEMALE	
Training motivated farmers in commercial horticultural production and application of new inputs.	100 Trainings	37	37%	1,333	477	
Specific crop training based on identified market priorities.	15 Trainings	6	40%	207	99	
Set-up of training farms with lead farmers, demonstrating the completed tool-kit of new inputs, pre- and post-harvest techniques to clustered producers.	100 Training Farms	104	104%	104	16	
Organization of field days on lead farmer demonstration plots.	120 Field Days	92	77%	1,297	601	
Organization of field trainings by lead farmers (farmer-to-farmer extension).	75 Field Trainings	27	36%	501	247	
Organization of exposure trips to other provinces, or to neighboring countries.	24 Exposure Trips	13	54%	182	54	
Organization of farmer meetings for sharing issues, experiences, and successes related to commercial horticultural production.	24 Farmer Meets	11	46%	188	56	
Development and distribution of extension materials (leaflets, brochures, etc) on technical know-how of specific crop production and application of new inputs.	2,000 Leaflets / Brochures Distributed	694 leaflets (pesticides; seeds; fertilizer use)	35%	694	404	

#### **ADOPTION OF AGRICULTURAL INPUTS**

- 1,306 OUT OF 1,540 TRAINED FARMERS HAVE ADOPTED AT LEAST A SINGLE PROMOTED INPUT, CLASSIFIED IN THE FOLLOWING TABLES INTO 4 LEVELS.
- 504 (39%) WERE WOMEN-HEADED FARMS. AT THE MID-POINT, ADOPTION LEVEL-1 "FULL TOOK KIT" IS 34% OF THE TOTAL ADOPTIVE FARMERS, WHICH IS SLIGHTLY OVER THE PROJECT TARGET OF 30%.
- THE MAIN CHALLENGE FOR THE REST OF THE PROJECT LIFE IS TO ROLL OUT MORE ADOPTIVE FARMERS TO MEET THE OVERALL PROJECT TARGET OF 3,000 ADOPTIVE FARMERS.

	Trained	d Number of Adoptive HORT Farmer					
Province	Clients	Training Farms	Level 1	Level 2	Level 2 Level 3		Total
Banteay Meanchey	690	42	131	51	97	219	540
Otdar Meanchey	544	29	105	13	13 98		402
Siem Reap	306	33	101	8	8 77		364
Total	1,540	104	337	72	72 272		1,306
TRAINING FARMS	LEVEL 1	LE	VEL 2	LEV	LEVEL 3		/EL 4
Selected lead farms received a Level-1 package of subsidized inputs as a 'kick-start'.	Drip irrigation Plastic mulchin film Trellis net Seedling tray High quality se Fertilizer (for 'fertigation') Pesticide Fungicide	<ul> <li>Trellis</li> <li>Seedlii</li> <li>High q</li> <li>Fertiliz</li> <li>Pestici</li> <li>Fungic</li> <li>N</li> </ul>	net ng tray juality seeds zer ide :ide :ide NOTE: Level .evel-4 is us	<ul> <li>High quadratic sector in the sector is a sector i</li></ul>	<ul> <li>High quality seeds</li> <li>Fertilizer</li> <li>Pesticide</li> <li>Fungicide</li> <li>1 can be considered en of the "full toolkit" of it</li> </ul>		least a ommended . high ed, oesticide, ). whereas

A FIELD OF EGGPLANT GROWN WITH IMPROVED INPUTS SUCH AS PLASTIC MULCHING FILM AND DRIP IRRIGATION.

## **INCREASE IN ANNUAL PROFIT OF HORT FARMERS**

ANALYSIS OF INCOME IMPACT OF 230 HORT FARMERS WHO KEPT RECORD BOOKS INDICATED:

- THE AVERAGE (MEAN) ANNUAL INCREASE IN PROFIT FOR HORT FARMERS WAS \$789.
- THE MEDIAN INCREASE IN PROFIT WAS \$748.
- THE MAXIMUM INCOME INCREASE WAS \$7,065, THE MINIMUM \$310 (BASELINE AVERAGE WAS \$387).

THE GRAPHS BELOW SHOW THE ANNUAL PROFIT INCREASE OF HORT FARMERS, COMPARED TO BASELINE. NOTE ESPECIALLY THE LARGE INCREASE IN THE PERCENTAGE OF HORT FARMERS MAKING AN ANNUAL PROFIT INCREASE OVER BASELINE GREATER THAN \$2,000, i.e. 34% INCREASE.



Annual Increase in Profit of HORT Farmers

**Compared to Baseline** 

#### Categorization of Annual Increase in Profit of HORT Farmers Compared to Baseline



## HORT FARMERS' ADOPTION OF INPUTS / TECHNOLOGIES

IN COMPONENT-2 CODES PROJECT FOCUSED ON THE PROMOTION OF IMPROVED PRODUCTION INPUTS AND TECHNOLOGIES FOR INCREASED PRODUCTIVITY, QUALITY, AND INCREASED PROFIT. SURVEY OF 225 HORT FARMERS CLEARLY SHOWED SUBSTANTIAL ADOPTION OF THE INPUTS AND TECHNOLOGIES PROMOTED BY CODES, ALTHOUGH SOME OF THE INPUTS SEEM TO BE SLOWLY ADOPTED, e.g. SHADE / RAIN COVER, PLASTIC MULCHING FILM, AND SEEDLING TRAYS.



**ADOPTION OF PRODUCTION INPUTS / TECHNOLOGIES COMPARED TO BASELINE** 









Seeds









Inputs / **Technologies** 

Plastic Micro-Mulching Irrigation Film

Seedling Trays

**Raised Bed** Branded Cultivation

**Net Trellis** 

Chemical **Fertilizers** 

Chemical Pesticides

Shade/ Rain Cover

#### AS ILLUSTRATED BELOW, YIELDS OF ALL MAIN CROPS SUBSTANTIALLY INCREASED, COMPARED TO BASELINE.

Cucumber	Baseline	Mid-Point
	1.3 kg/m²	2.5 kg/m <sup>2</sup>

	Sweet Corn	Baseline	Mid-Point
N/		0.8 kg/m <sup>2</sup>	1.6 kg/m <sup>2</sup>









ard Long Bean	Baseline	Mid-Point
	1.1 kg/m <sup>2</sup>	2.2 kg/m <sup>2</sup>



Bitter Gourd	Baseline	Mid-Point
	0.9 kg/m²	2.2 kg/m <sup>2</sup>











## HORT PRODUCTIVITY AND ADOPTION OF INPUTS



REVIEW OF PROJECT DOCUMENTS AND FOCUS GROUP DISCUSSIONS INDICATED THAT PRODUCTIVITY LARGELY DEPENDS ON THE LEVEL OF ADOPTION OF THE PROMOTED PRODUCTION INPUTS AND TECHNOLOGIES, CONFIRMING A BASIC ASSUMPTION OF CODES. THOUGH THE INITIAL PRODUCTION COST WAS FAIRLY HIGH FOR ADOPTING THE COMPLETE TOOL KIT OF NEW INPUTS, A SUBSTANTIAL PROFIT WAS GENERALLY MADE AT THE FIRST CROP, EVEN GIVEN MODERATE MARKET PRICES (e.g. 1,000 RIEL/KG FOR CUCUMBER). HOWEVER, IT IS IMPORTANT TO NOTE THAT INCREASE IN YIELD IS NOT THE ONLY DETERMINANT TO MAKING MORE PROFIT. PEST & DISEASE CONTROL, CROP SCHEDULING TO HARVEST AT THE RIGHT TIME, QUALITY GRADING, INCREASED AREA UNDER CULTIVATION, MARKET KNOWLEDGE, ETC, ARE OTHER SIGNIFICANT FACTORS.

#### **PRODUCTION AND MARKETING SKILLS IN COMMERCIAL HORT PRODUCTION**

THROUGH IMPLEMENTATION OF VARIOUS 'TRAINING-IN' ACTIVITIES, AND FARMER-TO-FARMER EXTENSION APPROACHES, CODES PROJECT HAS BEEN EFFECTIVE IN ENRICHING THE TECHNICAL CAPACITY OF PARTICIPATING FARMERS IN COMMERCIAL HORTICULTURE PRODUCTION AND MARKETING. SURVEY OF 225 HORTICULTURE FARMERS INDICATED THAT:

- 73% OF ADOPTIVE FARMERS REPORTED INCREASED KNOWLEDGE AND SKILLS IN COMMERCIAL HORTICULTURE PRODUCTION (END-PROJECT TARGET 70%).
- 79% OF ADOPTIVE FARMERS CLAIMED INCREASED KNOWLEDGE AND SKILLS IN COMMERCIAL HORTICULTURE MARKETING (END-PROJECT TARGET 70%).











## FOCUS GROUP DISCUSSION – COMMERCIAL FARMERS

- CODES' commercial farmers reported that the technical support from the project was very much encouraging them to transform from conventional farming to commercial through improved farming practice.
- They also indicated that CODES had opened their eyes by providing knowledge and improved techniques for commercial vegetable production.
- Most commercial famers have increased their land under vegetable cultivation as they did not require more labor and saved water.
- Dramatic change in profits was reported, due to increased crop cycles, larger land area under cultivation, and using labor-saving irrigation such as drip and spray tubes.
- They expressed their appreciation to CODES for results such as increasing physical assets, and affording to support their children to go to school regularly.

- The farmers clearly knew how to successfully grow a variety of vegetables such as cucumbers, wax gourd, yard long bean, chili, tomato, and watermelon.
- When they applied what they learned from training in vegetable cultivation, and advice from CODES Field Technicians, they significantly increased yields.
- They knew where to find CODES-promoted inputs for cultivating vegetables.
- Through using improved seeds and farming practices, they got improved quality that could satisfy market requirements.
- They knew about safe use of agrochemicals, use of the correct pesticides, withholding period, and proper use of personal protective equipment for spraying.
- They noted establishment of good linkages with collectors and wholesalers.







OUTPUT-4: ACCESS TO MARKETS, INCLUDING A NON-CONVENTIONAL MARKET SYSTEM FOR COMPONENT-1; THE CONVENTIONAL MARKET SYSTEM FOR COMPONENT-2; AND EXPORT READINESS.

NOTE: THIS IS A CROSSCUTTING OUTPUT, WITH APPLICATION TO BOTH COMPONENT-1 AND -2.

All Water

CHERRY TOMATOES ARE A NEW CROP FOR CAMBODIA, INTRODUCED BY CODES PROJECT TO MEET EXISTING DEMAND BY THE RESTAURANT MARKETS IN SIEM REAP AND PHNOM PENH. REMARKABLY, THE AVERAGE CAMBODIAN HAS FOUND THEM TO BE A TASTY SNACK FOOD, EATEN RAW WITH SALT, SUGAR, AND CHILI.

#### **RESULTS MEASUREMENT TABLE – OUTPUT-4**

#### Cross-cutting Output, i.e. applies to both Component-1 and Component-2 (refer to Results Diagram).

Output-4: Access to markets, including a non-conventional market system for Component-1; the conventional market system for Component-2; and export readiness.

	Indicator		Targets at End of Project		Measurement Against Targets at Mid-Point		Methodology / Data Sources
•	New market models for high-value crops, recognising the importance of crop aggregation developed and operational.	•	Non-conventional market system developed and operational for selected high-value crops.	•	<ul> <li>Two non-conventional marketing models developed:</li> <li>"Niche market" crops sold through the Melon Ass'.</li> <li>"Common market" crops sold through localized aggregation points.</li> </ul>	•	Human Centred Design research. CODES internal market access strategy.
•	Number of involved high-value crop farmers trained in pre- and post-harvest handling techniques and use of market information.	•	Target: 500 high-value crop farmers (50% $\bigcirc$ ).	•	87 high-value crop farmers trained, 37% female. [Note: Training will be accelerated, now that many high-value farmers are operational.]	•	Training logs.
•	Number of commercial horticulture farmers trained in pre and post- harvest handling techniques and use of market information.	•	Target: 3,000 commercial horticulture farmers (50% ♀).	•	1,083 commercial horticulture farmers trained, 50% female.	•	Plant & Food Reports.
•	Number of collectors trained in 1).access to provincial markets, later to inter-provincial 2).post-harvest handling, primarily grading and 3). market orientation for improved guidance to farmers.	•	Target: 150 Collectors (including existing collectors), 50% $Q$ .	•	157 Collectors trained, 90% female.	•	Training logs.
•	Number of field visits of collectors conducted to production sites.	•	Target: 34 field visits of Collectors to production sites.	•	8 field visits conducted.	•	Field visit logs.
•	Number of vegetable forums organized with participation from relevant actors.	•	Target: 12 vegetable forums to be conducted.	•	9 vegetable forums conducted.	•	Forum logs.
•	Capacity of project staff and lead farmers in post-harvest handling, including meeting quality, packaging, traceability, and phytosanitary requirements.	•	Target: all relevant project staff and selected lead farmers.	•	10 project staff, 15 lead farmers, and 12 Collectors trained by Plant & Food Research post-harvest team, including traceability and phytosanitary requirements. [Note: Consultant training in traceability and phytosanitary requirements should not be construed as achieving "export readiness" however.]	•	Plant & Food post- harvest report. CODES farmer logs.

**NOTE**: CODES had no specific activity in regard to export readiness in the first half of the project. Likewise, there was no specific 'export readiness' indicators or targets.

### **ACTIVITY SUMMARY – OUTPUT-4**

ΔCTIVITIES	TARGET	TARGET		PARTICIPANTS		
	END OF PROJECT			TOTAL	FEMALE	
Training in pre- & post-harvest handling techniques and use of market information delivered to HI-VALUE crops producers.	17 Trainings	6	35%	87	33	
Training in pre-post-harvest handling techniques and use of market information delivered to commercial HORT producers.	100 Trainings	38	38%	1083	543	
Training of collectors in 1).access to provincial markets, later to inter-provincial 2). post-harvest handling, primarily grading and 3). market orientation for improved guidance.	10 Trainings	8	80%	157	142	
Training in technical know-how of vegetable production and in business concepts delivered to existing collectors.	18 Trainings	6	33%	117	102	
Consensus building workshop of new market models for high value crops in regard to crop aggregation.	5 Workshops	1	20%	71	25	
Organization of field visits of collectors to production sites.	18 Field Visits	8	44%	126	97	
Organization of vegetable forums for promoting the business linkages of relevant actors in horticultural value chain.	12 Forums	9	75%	164	90	
Development of new market models for high-value crops, recognizing the importance of crop aggregation developed and operational.	5 Trainings	1	20%	41	7	
Organization of trade fairs for the introduction and promotion of high-value crops.	15 Trade Fairs	10	67%	40	17	
Awareness raising of new market models for high-value crops in regard to crop aggregation.	20 Meetings / Events	9	45%	205	122	

#### **INITIATIVES FOR BETTER MARKETABILITY**

PROPER HARVESTING, PACKAGING, QUALITY GRADING, AND USE OF MARKET INFORMATION FOR PRICE NEGOTIATION AND CROP SCHEDULING WAS INCREASINGLY ADOPTED BY HORT FARMERS. SURVEY OF 225 HORT FARMERS INDICATED THAT 74% HAVE ADOPTED PRE- AND POST-HARVEST HANDLING PRACTICES.

#### Adoption of Pre-and Post Harvest Techniques for Better Marketability



THIS 'HERITAGE' VARIETY OF EGGPLANT IS ALWAYS POPULAR IN CAMBODIAN COOKING.

#### SURVEY OF COLLECTORS

50 COLLECTORS WERE INTERVIEWED USING A QUESTIONNAIRE. THE OBJECTIVE WAS TO DETERMINE THE BENEFITS OF THEIR INVOLVEMENT WITH CODES, AND THE EFFECTIVENESS OF MARKET LINKAGE THROUGH COLLECTORS.



THE SURVEY INDICATED THAT THE BENEFITS COLLECTORS PERCEIVED FROM CODES WERE:

- 81% REPORTED THEY INCREASED THE AMOUNT OF VEGETABLES COLLECTED AND TRADED.
- 96% REPORTED THERE HAS BEEN AN INCREASE IN THEIR DAILY SALES AND PROFITS.

COLLECTORS REPORTED THAT THEIR PROFIT INCREASED AS A RESULT OF THE FOLLOWING FACTORS:

- THE NUMBER OF THEIR FARMER-SUPPLIERS INCREASED AS A RESULT OF CODES PROJECT TRAINING MORE FARMERS.
- REDUCTION OF VEGETABLE LOSS WHEN PROPER TRANSPORTATION AND STORAGE TECHNIQUES WERE APPLIED.
- MOST FARMERS TRAINED BY CODES PROJECT APPLIED HARVESTING, CLEANING, AND GRADING PRACTICES THAT MEET MARKET DEMAND.
- BETTER NETWORKING WITH OTHER COLLECTORS INSIDE AND OUTSIDE THEIR PROVINCE.

OUTPUT-5: TRAINING IN EFFICACY / HEALTH & SAFETY / ENVIRONMENTAL ASPECTS OF AGROCHEMICALS, i.e. FERTILIZERS AND PESTICIDES, FOR ALL FARMERS.

NOTE: THIS IS A CROSSCUTTING OUTPUT, WITH APPLICATION TO BOTH COMPONENT-1 AND -2.



## **RESULTS MEASUREMENT TABLE – OUTPUT-5**

#### Cross-cutting Output, i.e. applies to both Component-1 and Component-2 (refer to Results Diagram).

Output-5: Training in efficacy / health & safety / environmental aspects of agrochemicals, i.e. fertilisers and pesticides, for all farmers.

Indicator	Targets at End of Project	Measurement Against Targets at Mid-Point	Methodology / Data Sources
<ul> <li>Number of high-value crop farmers trained in efficacy / health &amp; safety / environmental aspects of agrochemicals; and in pest &amp; disease identification and control.</li> </ul>	• Target: 500 high-value crop farmers (50% ♀).	<ul> <li>472 farmers trained in agrochemical use for high-value crop oriented production:</li> <li>263 actual high-value crop farmers trained, 50% female.</li> <li>209 "interested" farmers also trained, 33% female.</li> </ul>	• Training logs.
<ul> <li>Number of commercial horticulture farmers trained in efficacy / health &amp; safety / environmental aspects of agrochemicals; and in pest &amp; disease identification and control.</li> </ul>	<ul> <li>Target: 3,000 commercial horticulture farmers (50% ♀).</li> </ul>	<ul> <li>2070 farmers trained in agrochemical use for commercial horticulture oriented production: 1193 commercial horticulture farmers trained, 53% female. 877 "interested" farmers trained, 46% female.</li> </ul>	Training logs.
• Research to examine farmers' perceptions, attitudes, and practices related to the purchase, use, storage, and disposal of pest control chemicals conducted by the Human Centred Design (HCD).	<ul> <li>Technological and behaviour-change approaches identified and developed that will improve the safety of pesticide use by producers.</li> </ul>	<ul> <li>Farmer attitude and behaviours research in regard to pesticides conducted by iDE Human Centred Design team. Insights from this excellent work will certainly be of value in changing producer behaviours. [Note: This report was also presented to a USAID symposium in Siem Reap.]</li> </ul>	<ul> <li>iDE Human Centred Design team report.</li> </ul>
<ul> <li>Training in health, safety, regulatory issues of agrochemicals; and in disease identification and control by NZ consultants delivered to relevant project staffs and lead farmers.</li> </ul>	Target: all relevant project staff.	<ul> <li>9 project staff and 327farmers trained by Plant &amp; Food consultants.</li> </ul>	<ul> <li>Plant &amp; Food reports. CODES training logs.</li> </ul>
<ul> <li>Number of extension materials on safe use of agrochemicals developed and distributed.</li> </ul>	Target: 2,000 leaflets / brochures developed and distributed.	• A large-size poster on safe use of agrochemicals, suitable for wall hanging on homesteads, was developed and 1000 units were distributed to farmers.	Distribution log.

### **ACTIVITY SUMMARY – OUTPUT-5**

Activition	Target by The	Drogross	Participants		
Activities	End of Project	Achieved	Progress	Total	Female
Training in efficacy / health & safety / environmental aspects of agrochemicals, i.e. fertilizers and pesticides, for HI-VALUE crop farmers.	500 farmers 17 Trainings	16	94%	472	203
Training in efficacy/health & safety/environmental aspect of agrochemicals; and disease identification and control, for HORT farmers.	3000 farmers 100 Trainings	62	62%	2070	1036
Development and distribution of extension materials (leaflets, brochures, etc) on safe use of agrochemicals.	2,000 Leaflets	1000	50%	568	347
Improvement of usability of pest and disease identification and control database.	1 Database	1	100%	19	6
Development and distribution of extension materials (leaflets) on pest and disease identification for farmers.	No target	500		489	290

# PERSONAL PROTECTIVE EQUIPMENT (PPE) INTRODUCED

APPROPRIATE PPE WERE IDENTIFIED, INTRODUCED, AND PROMOTED. PROMOTION INCLUDED: • Various training activities. • Close work with local input suppliers and collectors.

- Encouragement of training farms and other key farmers to pass safe practices to other farmers, including rice farmers.
- Development of relevant posters and factsheets.
- Collaboration with Provincial Departments of Agriculture.

### **IMPROVED FARM HEALTH & SAFETY**

### SURVEY OF 225 HORT FARMERS INDICATED SUBSTANTIAL INCREASE IN SAFE PRACTICES OF AGROCHEMICAL USE.

DESCRIPTION	BASELINE	MID-POINT
Farmers reporting applying safe use of agrochemicals	4%	56%
Farmers reporting properly washing sprayers	33%	62%
Farmers reporting adhering to withholding period before harvest	15%	42%









#### **IMPROVED FARM SAFETY PRACTICES**

CODES HAS HAD SIGNIFICANT IMPACT ON CHANGING THE PERCEPTION AND BEHAVIOR OF FARMERS IN REGARD TO SAFE USE OF AGROCHEMICALS. SURVEY OF 107 HI-VALUE CROP FARMERS SHOWED:

- 64% APPLY SAFE USE OF AGROCHEMICALS
- 57% ADHERE TO WITHHOLDING PERIOD
- 62% PROPERLY WASH SPRAYERS.



Positive change is occurring in usage and storage of agrochemicals.









## USE OF PERSONAL PROTECTIVE EQUIPMENT

# IN COMPARISON TO THE BASELINE, CODES DEMONSTRATED SUCCESS IN INTRODUCTION OF PERSONAL PROTECTIVE EQUIPMENT (PPE) TO HI-VALUE CROP FARMERS.



Note: Dusk masks do not work with pesticide spraying, only with dry particulates. CODES promotes use of waterproof respirators instead of dusk masks.

### OUTPUT-6: ACCESS TO CREDIT FOR ALL FARMERS.

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LFP TRAINING CONDUCTED BY MFI PARTNER AI

NOTE 1: THIS IS A CROSSCUTTING OUTPUT, WITH APPLICATION TO BOTH COMPONENT-1 AND -2.

NOTE 2: DUE TO THE WEAKNESS OF THE NZD, THE OUTPUT-6 BUDGET WAS ELIMINATED, AND HEADCOUNT REDUCED, STARTING IN CODES YEAR-3 (JUL-2016). OUTPUT-6 'ACCESS TO CREDIT' ACTIVITY WAS THEN CONTINUED BY FOUR PARTICIPATING MFI PARTNERS, COORDINATED BY THE OUTPUT-5 FACILITATOR.

#### Cross-cutting Output, i.e. applies to both Component-1 and Component-2 (refer to Results Diagram).

#### Output-6: Access to credit for all farmers.

	Indicator	Targets at End of Project	Measurement Against Targets at Mid-Point	Methodology / Data Sources
•	Number of private Sector Partnerships (PSPs) with MFIs developed and maintained to improve access of favourable credits for all associated farmers.	<ul> <li>Linkage between interested farmers and cooperating MFIs measurably improved through regular sharing the lists of farmers, who potentially become customers of MFIs.</li> </ul>	<ul> <li>4 participating MFI partners providing training and receiving lists of CODES farmers:         <ol> <li>PRASAC</li> <li>AMRET</li> <li>AMK</li> <li>Sathapana</li> </ol> </li> </ul>	Observation of training provided by cooperating MFIs.
•	Number of associated farmers trained by cooperating MFIs in access to credit and small business concept 'farming is a business', including simple financial record keeping and family saving.	<ul> <li>Target: 500 high-value crop farmers (20 trainings conducted).</li></ul>	<ul> <li>6 'credit' trainings conducted for 191 high-value crop farmers, 46% women.</li> <li>47 'credit' trainings conducted for 1,663 commercial horticulture farmers, 43% women.</li> <li>47 trainings in simple financial record keeping for 1,250 participants, 48% women, provided by Provincial Dept of Agriculture (PDA) consultants.</li> <li>203 participants received strengthening in savings groups, 55% women, from CODES Output-6 Facilitator.</li> </ul>	• Training logs.

### **ACTIVITY SUMMARY – OUTPUT-6**

	TARGET BY END OF PROJECT	ACHIEVED	PROGRESS	PARTICIPANTS	
ACTIVITIES				TOTAL	FEMALE
Development of linkages with private sector MFIs to promote and expand the availability of credit for smallholder producers.	4 MFIs	4	100%		
	500 HI-VALUE Farmers 20 Trainings -and- 3,000 HORT Farmers 80 Trainings	6	30%	191	87
Training farmers in access to credit by MFIs.		47	59%	1,663	712
Training in simple financial record keeping for all farmers.	100 Trainings	47	47%	1,250	604
Facilitate formation of Saving Groups for interested HORT farmers.	30 Savings Groups	14	47%	203	111

ACCESS TO CREDIT HAS BEEN REMARKABLY IMPROVED BY CODES WORKING CLOSELY WITH MFI PARTNERS AMK, AMRET, PRASAC AND SATHAPANA, WHO HAVE CREDIT AGENTS AT THE VILLAGE LEVEL WITH AGRICULTURAL LOAN PRODUCTS.

SURVEY OF 107 HI-VALUE FARMERS INDICATED THAT 67% ACCE3SSED CREDIT, COMPARED TO 28% BASELINE.

- 52% ACCESSED CREDIT FROM CODES PARTNER MFIs.
- AVERAGE LOAN SIZE WAS \$1,075; MAXIMUM=\$7,500; MINIMUM=\$100.

SURVEY OF 225 HORT FARMERS INDICATED THAT 41% ACCESSED CREDIT, COMPARED TO 28% BASELINE.

- 18% ACCESSED CREDIT FROM CODES PARTNER MFIs.
- AVERAGE LOAN SIZE WAS \$941; MAXIMUM=\$2,500; MINIMUM=\$120.

PLASTIC AGRICULTURAL 'MULCHING' FILM — PURCHASED USING CREDIT — WILL REPAY ITS INVESTMENT COST BY ALLOWING OFF-SEASON CULTIVATION.

## SOURCES AND USES OF CREDIT

#### SURVEY OF 107 HI-VALUE FARMERS INDICATED:

- 41% used loans for horticulture farming
- 33% for livestock
- 21% for non-agricultural business
- 5% for other purposes such as health care, buying new assets, home renovation.

#### SURVEY OF 225 HORT FARMERS INDICATED:

- 39% obtained loans for vegetable cultivation
- 45% for livestock activity
- 15% for non-agricultural business
- 1% for other purposes such as health care, buying new assets, home renovation.



OUTPUT-7: ACCESS TO AGRICULTURAL INPUTS FOR ALL FARMERS VIA DISTRICT- AND COMMUNE-LEVEL INPUT SUPPLIERS AND RELATED PRIVATE SECTOR PARTNERSHIPS..



NOTE 1: THIS IS A CROSSCUTTING OUTPUT, WITH APPLICATION TO BOTH COMPONENT-1 AND -2.

NOTE 2: DUE TO THE WEAKNESS OF THE NZD, THE OUTPUT-7 BUDGET WAS ELIMINATED, WITH HEADCOUNT REDUCTION, STARTING IN CODES YEAR-3 (JUL-2016). OUTPUT-7 'ACCESS TO INPUTS' ACTIVITY THEN WAS CONTINUED BY INTEGRATION INTO OUTPUT-3, OUTPUT-4, AND OUTPUT-5 ACTIVITIES.

## **RESULTS MEASUREMENT TABLE – OUTPUT-7**

Cross-cutting Output, i.e. applies to both Component-1 and Component-2 (refer to Results Diagram).

#### Output-7: Access to agricultural inputs for all farmers via District- and Commune-level input suppliers and related Private Sector Partnerships.

Note: Due to the weakness of the NZD, the Output-7 budget was eliminated, and headcount reduced, starting in CODES Year-3 (JUL-2016). Output-6 'Access to Credit' activity is being continued by integration into Output-3, Output-4, and Output-5 activities.

Indicator	Targets at End of Project	Measurement Against Targets at Mid-Point	Methodology / Data Sources
• Number of Private Sector Partnerships (PSPs) with input supply companies developed and maintained for promotion of improved agricultural inputs in the target areas.	[No specific target]	<ul> <li>4 'Corporate' input supply partnerships actively provided training to CODES clients:         <ul> <li>Asia Irrigation</li> <li>17 trainings</li> <li>Nileda</li> <li>15 trainings</li> <li>Papaya Trade</li> <li>5 trainings</li> <li>CODES also actively promotes inputs from the following companies, although they did not provide trainings:             <ul> <li>Agrotech Vita</li> <li>East West Seed (and other seeds)</li> <li>Malisan</li> <li>Prum Bunthai Enterprise</li> <li>25 Commune- and District-level input supply companies.</li> </ul> </li> </ul></li></ul>	Observation of Private Sector Partner training.
	<ul> <li>Target: tool-kit of improved agricultural inputs available at 25 local input suppliers for sale to associated farmers.</li> </ul>	<ul> <li>The key agricultural input 'tool kit' list has grown from 9 items to 18, including safety gear. Supply shops report stocking: <ol> <li>Plastic mulching film</li> <li>Seeding trays</li> <li>Shade / rain cover</li> <li>Shade / rain cover</li> <li>Chemical pesticides</li> <li>Chemical pesticides</li> <li>Chemical fertilizers</li> <li>Chemical fertilizers</li> <li>Chemical fertilizers</li> <li>Rubber gloves</li> <li>Rubber boots</li> <li>Bu%</li> <li>Dust (surgical) masks</li> <li>Respirators</li> <li>Irrigation spray tubes</li> <li>Safety glasses</li> <li>Mini-sprinklers</li> <li>Mini-sprinklers</li> </ol> </li> </ul>	• Survey of 25 key input supply partners.
<ul> <li>Number of local input suppliers trained in technical know-how and application of new inputs/products.</li> </ul>	<ul> <li>Target: at least 25 local input suppliers (50% ♀) trained and able to provide good technical advice to their farmer customers.</li> </ul>	<ul> <li>25 key local input suppliers trained, 48% female.</li> </ul>	Survey of 25 key input supply partners.
<ul> <li>Number of local input suppliers trained in efficacy / health &amp; safety / environmental aspects of agrochemicals.</li> </ul>	• Target: at least 25 local input suppliers (50% ♀) trained and provide good advice on safe use of agrochemicals to their customers.	25 local input suppliers trained, 48% female.	Survey of 25 key input supply partners.

#### **ACTIVITY SUMMARY – OUTPUT-7**

ACTIVITIES	TARGET BY END OF PROJECT	ACHIEVED	PROGRESS	PARTICIPANTS	
				TOTAL	FEMALE
Identification of lead private sector input suppliers and incorporation of these groups into trainings and farmer field days for both high-value and commercial horticulture.	100 Instances	44	44%	44	18
Training in technical know-how and application of new inputs/products for input suppliers.	12 Trainings	9	75%	107	48
Training in efficacy / health & safety / environmental aspects of agrochemicals.	12 Trainings	13	108%	339	108
Training workshop in small business concepts and embedded services for input suppliers.	12 Trainings / Workshops	3	25%	37	9
Regulatory and safety training of input suppliers in agrochemicals provided by Provincial Departments of Agriculture.	12 Training Sessions	12	100%	332	111
Joint trials with input companies for improving access of new inputs to all farmers (e.g. share resource to set up trial farms, demonstrations, development of promotion materials).	30 Trials	35	117%	35	19

#### AVAILABILITY OF AGRICULTURAL INPUTS

SURVEY OF 25 INPUT SUPPLIERS INDICATED SIGNIFICANT IMPROVEMENT IN AVAILABILITY OF CODES PROMOTED INPUTS:

- AT LEAST 8 OF OUT OF AN ORIGINAL LIST IN THE A.D.D. OF 9 'TOOL KIT' PROMOTED INPUTS ARE AVAILABLE AT ALL THE INPUT SUPPLIERS SURVEYED. THE LIST HAS NOW GROWN TO 18 ITEMS.
- PROMOTED PERSONAL PROTECTIVE EQUIPMENT INCLUDED: RESPIRATORS, WATERPROOF COATS, SAFETY GLASSES, RUBBER GLOVES, AND BOOTS ARE AVAILABLE AT MORE THAN 64% OF THE SURVEYED INPUT SUPPLIERS.



## **SURVEY OF 25 PARTNER INPUT SUPPLIERS**

• 100% of the input suppliers reported receiving CODES training in safe use of agrochemicals. 07 x bug

- 89% reported providing [free] embedded advice to farmers as part of the sale.
- 96% of input suppliers reported their annual profit significantly increased last year, due to increasing sales.
  - 92% have plans to expand their input business as they see the number of farmers increasing.
- 100% expressed their satisfaction with their partnership with codes project, with CODES helping to link farmers with their shops.
- their average number of input customers in 2016 was 1800, compared to 710 in 2014.

ROLLS OF DRIP IRRIGATION LINE READY FOR INSTALLATION IN THIS FARMER'S FIELD. PRIVATE SECTOR PARTNER, ASIA IRRIGATION, IS FEELING THE IMPACT OF COMPETITORS 'CROWDING IN' WITH LESS EXPENSIVE PRODUCTS.

YAMAJIMA

MAY

## INNOVATION: LABOUR SAVING MECHANICAL DEVICES

LABOUR IS AN ISSUE ON MANY OF CODES' CLIENTS FARMS. THREE NEW LABOUR-SAVING MECHANICAL DEVICES WERE IDENTIFIED AND INTRODUCED WITH THE HELP OF PLANT & FOOD RESEARCH CONSULTANTS. THESE ARE REASONABLY AFFORDABLE FOR COMMERCIAL HORTICULTURE FARMERS.

**Fertilizer injector:** 

- Easy and fast injection of prilled fertilizer
- Affordable and labour saving
- Effective in applying the recommended amount

Mini-cultivator / hilling machine:

- Cleans weeds between rows
- Creates raised cultivation beds
- Labor saving



## NEW LABOUR SAVING MECHANICAL DEVICES



Seedling gunner:

- Easy and fast transplanting seedlings
- Affordable and labor saving.

# **ASSESSMENT OF OTHER IMPACTS**

AN AGGREGATION POINT FOR SPRING ONIONS, A HI-VALUE CROP DISTRIBUTION TO THE MARKET WILL TAKE PLACE BY PARTICIPATING FARMERS, BY FARM GATE COLLECTORS, OR EVEN BE TRANSPORTED TO THE MELON ASSOCIATION WAREHOUSE

#### MAIN OCCUPATION OF FARMERS

51% OF 332 FARMERS INTERVIEWED REPORTED THEIR CURRENT MAIN OCCUPATION IS VEGETABLE CULTIVATION, WHILE AT BASELINE IT WAS 27%. THIS INDICATES THAT MORE FARMERS ARE INTERESTED AND INVOLVED IN COMMERCIAL VEGETABLE FARMING AS THE MAIN SOURCE OF HOUSEHOLD INCOME.

#### SOURCES OF INCOME



- Vegetable Production
- Trading/Small Business

#### **CHANGE IN FAMILY ASSETS**

SURVEY OF TOTAL 332 ADOPTIVE FARMERS, BOTH HI-VALUE AND HORT, INDICATED THAT 59% HAVE ADDED PHYSICAL ASSETS PURCHASED BY USING THE PROFITS FROM HORTICULTURAL FARMING. THE GRAPH BELOW INDICATES INDIVIDUAL ITEMS.


## **CREATION OF JOB OPPORTUNITES FOR WOMEN AND YOUTH**

COMMERCIAL HORTICULTURE CREATED A SIGNIFICANT NUMBER OF JOB OPPORTUNITIES FOR YOUNG PEOPLE AND WOMEN. SURVEY OF 332 ADOPTIVE FARMERS INDICATED THAT 32% HIRE NON-FAMILY LABOURERS AVERAGING SEVEN PEOPLE (MAXIMUM 20, MINIMUM 2) FOR OCCASIONAL WORK. REPORTEDLY, LABOURERS GET THE OPPORTUNITY TO LEARN NEW TECHNIQUES AND INNOVATIONS, LATER APPLYING WHAT THEY HAVE LEARNED AT THEIR OWN FARMS WHEN THEY GET ADEQUATE CAPITAL.



SURVEY OF 332 ADOPTIVE FARMERS FOUND THERE HAS BEEN A DECREASE IN MIGRATION OF FAMILY MEMBERS FOR WORK. 14% OF RESPONDENTS REPORTED THEIR FAMILY MEMBERS MIGRATED TO THAILAND SEEKING JOBS, MOSTLY DAILY WAGE LABOUR, WHILE AT BASELINE THERE WAS A 25% MIGRATION RATE.

## IMPACT ON EDUCATION OF CHILDREN

CODES PROJECT HAS HAD POSITIVE IMPACT ON EDUCATION OF CHILDREN AS SHOWN BY SURVEY OF 332 ADOPTIVE FARMERS. ALTHOUGH THERE IS NO BASELINE DATA, THE MID-POINT SURVEY INDICATED:

- 88% report their children are able to attend school regularly.
- 74% report they are able to financially support their children's education.
- 61% claim the main financial resource for children's education was from horticultural farming.

### WOMEN IN VEGETABLE CULTIVATION









- FROM PROJECT RECORDS, THE PERCENTAGE OF FEMALE INVOLVEMENT IN PROJECT ACTIVITIES WAS 47%, AGAINST A TARGET OF 50%.
- THE SURVEY OF 332 HOUSEHOLDS INDICATED 62% OF FEMALE HOUSEHOLD MEMBERS WERE ACTIVELY INVOLVED IN VEGETABLE PRODUCTION, COMPARED TO 53% BASELINE.
- 26% OF PRIMARY DECISION MAKERS ON CROP PLANTING WERE FEMALE, COMPARED TO BASELINE 17%.

## WOMEN'S ROLES IN HORTICULTURE

#### THE SURVEY OF 332 FARMERS INDICATED THAT:

- 1. THERE SEEMS TO BE MORE 'BOTH GENDER' ACTIVITY ON FARMS
- 2. THE ROLE OF WOMEN IN AGROCHEMICAL APPLICATION HAS SIGNIFICANTLY DECREASED
- 3. WOMEN REMAIN VERY DOMINANT IN MARKET-SIDE AND FINANCIAL ACTIVITIES, EXCEPT TRANSPORT





INTERVIEWS WERE HELD WITH 7 AGRICULTURAL OFFICERS FROM PROVINCIAL DEPARTMENTS OF AGRICULTURE, AND WITH 15 VILLAGE CHIEFS, TO DETERMINE LOCAL GOVERNMENT PERCEPTIONS OF CODES PROJECT.

## VILLAGE CHIEFS (15 interviewed):

- Village Chiefs in Banteay Meanchey and Siem Reap provinces—themselves farmers—mentioned that now they can see local farmers growing high-value vegetables, some mentioning cherry tomato, tomato, melon, and broccoli. In previous times, they saw these products always imported, presumably from Thailand.
- Village Chiefs reported that when CODES trained more farmers to become commercial farmers, the commercial farmers hired day-labor workers to work on farms. This has contributed to the reduction of migration to Thailand for work.
- Village Chiefs in Otdar Meanchey Province reported that after CODES came to their village, more farmers could grow a wider variety of vegetables such as cucumber, eggplant, bitter gourd, and rice melon, and enjoy increased daily harvests.

## **PROVINCIAL DEPARTMENTS OF AGRICULTURE (PDA):**

- CODES project activities are aligned with government priories as stated in the National Strategic Development Phase III (2014 -2018) on enhancement of the agriculture sector, particularly the vegetable sub-sector.
- All officials were satisfied with the CODES approach in terms of commercial farming practice. PDAs in Banteay Meanchey and Otdar Meanchey provinces have introduced this approach to food security NGOs for transforming conventional farmers to commercial farmers.
- It was noted that CODES project activity in training in safe use of agrochemicals has contributed to behavior change of vegetable farmers. The training is also having an impact on rice farmers.
- An official in Banteay Meanchey Province noted that according to research conducted by the Center for Policy Studies, there has been a reduction in vegetable imports from about 70% to 56%. Their perception is that CODES interventions significantly contributed to the reduction of imports.

# CONTRIBUTION TO iDE's "20-MILLION MORE" GOAL

"In the past 20-years iDE has globally improved the livelihoods of 20-million people. The challenge in the next 5-years is to reach an additional 20-million." Below is an estimate by the CODES team of the project's outreach—direct, indirect, and 'once removed'.

#### DIRECT AND INDIRECT PROJECT CLIENTSS:

- □ Vegetable clients trained:
  - 2,171 clients
  - 10,855 family members
- □ Vegetable collectors trained:
  - 145 collectors
  - 725 family members
  - 2,900 non-CODES suppliers
- □ Input suppliers trained:
  - 25 input suppliers
  - 125 family members
  - 7,500 non-CODES customers

TOTAL = 24,446

#### **PROJECT CLIENTS 'ONCE REMOVED":**

- Local and international NGOs and projects (KBA, RCDO, CIDO, Caritas, DPA, GRET, World Vision, SNV and ACHA) trained by CODES.
  - 3,300 farmers
- Provincial Departments of Agriculture (Banteay Meanchey, Otdar Meanchey and Siem Reap Provinces) trained by CODES.
  - 14,500 farmers
- Private Sector Partners (Asia Irrigation, Nilida, Papaya Trade, Green Eagle, Maly San Seeds companies) observing CODES farms and training sessions.
  36,700 farmer-customers
- Bayon Television (broadcasts and website about CODES melon farmers and how to grow melon).
  - 150,000 viewers

TOTAL = 204,500

## **'MOST SIGNIFICANT CHANGE' STORIES**

- THE M&E TEAM USED THE MOST SIGNIFICANT CHANGE TECHNIQUE FOR ASSESSING THE CHANGES AND IMPACTS OF CODES FROM THE PERSPECTIVE OF PROJECT CLIENTS.
- THE PROCESS IS PARTICIPATORY AS PROJECT CLIENTS WERE INVOLVED IN THE SELECTION OF STORIES OF CHANGE, AND IN ANALYZING THE COLLECTED INFORMATION (STORIES).
- THREE 'MOST SIGNIFICANT CHANGE' STORIES WERE CHOSEN TO INCLUDE IN THIS REPORT.



#### **DISSEMINATION OF KNOW-HOW**

# Sharing Labor, Expenses, and Profit in Melon Growing with Experienced Relatives for Resource-Poor and Limited-Skills Farmers.

Besides rice cultivation, Mr. Muon Sophal and his wife grow vegetables as a source of household income. At the beginning of 2014, having seen their relatives in the same village making good profit from hybrid melon cultivation introduced by CODES, he and his wife decided to grow melons. Because they were new to melon growing, and had a lack of technical know-how and working capital, they started growing melons with their more experienced relatives by sharing labor, expenses, and profit. After three crops of collaborative growing, they gained adequate experience and confidence in growing melons, and also earned substantial shared profit. They started separately growing melons in a rice field plot of 3,150-m<sup>2</sup> using their own investment and by

borrowing \$2,000 from a micro-finance institution (MFI). With technical support from CODES field technicians and their hard work, this first crop was very successful, obtaining high yield with good quality and making a large profit of \$5,474. After harvest, this plot was rotated, switching from melon to rice melon, a 'heritage' crop. The rice melon made them an additional \$4,493 profit. They were happy with the profits made from the first hybrid melon and rice melon crops. They decided to grow in another plot in wet season and also made good profit. The table below shows the annual economic benefits of \$13,512 after involvement in high-value melon cropping.



FIRST MELON CROP, MADE PROFIT OF \$5,474

Planting Date	Area (m²)	Crop	Expense (\$)	Income (\$)	Profit (\$)
18-JAN-16	3,600	Melon	2,856	8,330	5,474
05-APR-16	3,600	Rice Melon	757	5,250	4,493
17-AUG-16	2,400	Melon	1,456	4,063	2,607
30-OCT-16	2,400	Rice Melon	200	1,138	938
TOTAL			5,268	18,780	13,512

Using the money earned from horticulture, they were able to pay back the loan from the MFI and renovate their house. They further invested in farming, including digging new ponds for a dry season water supply, so they can grow more crops per year. Since he is open-minded and motivated to help others, Sophal has become a cluster leader of the melon association who helps in coordinating melon crop scheduling, and providing technical advice to other melon growers in his locality. Mr. Sophal plans to expand melon and other high-value crop farming for ensuring continuous cash flow. Mr. Sophal said "I need to find more plots with good water access in wet and dry season so that I can grow more crop cycles per year." He added "Thanks to CODES project for training farmers in melon growing and facilitating access to market. Farmers here, including my relatives, made good profits and their living conditions noticeably improved."



#### IMPROVED INPUTS AND TECHNOLOGIES CREATE OPPORTUNITIES FOR CROP DIVERSIFICATION AND INCOME GENERATION FOR SMALLHOLDER FARMERS

Mr. Len Norrong, 37-years old, married and a father of two daughters, was a migrant from Kampong Cham province to Boeung village, Trapean Prei commune, Anlong Veng district, Otdar Meanchey province in 2007 to seek new land and a place in which to earn a living. Narrong's wife ran a small wedding make-up business to earn a living, with too little income and much seasonality, and Narrong was a traditional vegetable farmer. Now, Narrong has become a commercially-aware farmer, who can make high income and function as a key model farmer for both his village and CODES project. The success that Narrong has today derived from his hard-work, commitment, motivation in Farming is a Business<sup>™</sup>, and also from frequent follow-up visits and advice from CODES technicians.

He said "Before CODES, I could cultivate vegetables in a maximum area of 1,500-m<sup>2</sup> and one crop cycle per year. But now, through adopting improved farming practices using new inputs such as: drip irrigation, spray tubes, plastic mulching film, net trellising, and proper pest and disease management and fertilization, I successfully cultivate various varieties of both fruiting and green leafy vegetables, up to nearly 1-hectare, with less labor required." The table below shows Narrong's profit from commercial horticulture during a <u>9-month</u> period in 2016.

Description	Traditional Farming (before CODES)	Improved Farming	Difference
Land size	1,500-m <sup>2</sup>	8,057-m <sup>2</sup>	6,557-m <sup>2</sup>
Crops	cucumber, yard long beans	cucumber, eggplant, hot chili, mustard greens, spring onions, watermelon	eggplant, hot chili, mustard greens, spring onions, watermelon
Crop cycles/year	1-cycle	2-cycles	1-cycle
Expense	\$650	\$1,645	\$995
Income	\$753	\$6,741	\$5,988
Profit	\$103	\$5,096	\$4, 993

Narrong said, "During a 9-month period, I made a huge profit of about \$5,000 from cucumber, green leafy vegetables, pumpkin, watermelon, eggplant and hot chili farming. Next cycle, I'm planning to increase the cultivated area up to 2-hectares for off-season watermelon and pumpkin. I really want my villagers growing vegetables to constantly supply local markets to cut down imports from neighboring countries and ensure safe produce. To me, we still have a big opportunity to compete with imports. I like the commercial farming initiatives of CODES project, and I'm really proud of my work."

#### INTRODUCED TECHNOLOGIES AND INPUTS; AND HIGH-VALUE CROPS, HELP WOMAN-HEADED FARM MAKE SIGNIFICANT PROFIT INCREASE.

Ms. Horl Sreimom is one of the womenheaded farms involved with CODES project in 2016. She joined CODES after seeing relatives living in nearby villages make a good profit from growing high-value crops introduced by CODES. Before CODES, she grew chili, eggplant and cucumber in the traditional manner. She cultivated these crops in large areas, but got very poor yields and little profit. She said "Doing conventional farming, I never got a harvest more than 100-kg per day, but now I cultivate high-value crops with the improved practices and new inputs and can



get income up to \$375 for 2 days harvesting. I never thought of this much increase in yield and income." She added "I really like the improved farming practices with new inputs because it helps me successufully cultivate the crops in larger plots at any season, although I am the only labor doing farming." Ms. Sreimom was very happy with the farm profit of \$5,428 she made this year as it is a huge increase compared to before involvement with CODES, which was only \$350. The table below shows a comparison of her farm profits before and after involvement with CODES project in 2016.

Description	Traditional Farming (before project)	Improved Farming	Difference
Land size	800-m <sup>2</sup>	5,866-m <sup>2</sup>	5,066-m <sup>2</sup>
Crops	Cucumber, yard long beans	hot chili, tomato, head cabbage	hot chili, tomato, head cabbage
Crop cycle	1-cycle	2-cycles	1-cycle
Expense	\$500	\$1,194	\$694
Income	\$850	\$6,622	\$5,772
Profit	\$350	\$5,428	\$5,078

She is very proud of what she has learned, and the benefits from involvement with CODES. She expressed that "Cultivation of high-value crops using improved practices made my living condition much better. I have recently bought two pieces of farmland, and filled with dirt to raising the land for wet season production. Also, I gained significant knowledge and skill in commercial farming and better market linkage, and feel very confident in this farming as a business, although I still need some technical support from CODES on pest and disease control."

Ms. Sreimom is hard-working, motivated, and eager to learn. She has now become a lead farmer in her village and actively shares her knowledge and skills to other farmers. Sometimes she also helps other farmers install drip irrigation systems. She wishes to grow high-value crops for constant supply to market to have continuous cash flow. This wet season, she plans to grow tomatoes for premium off-season market prices.