



FEED THE FUTURE

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



FEED THE FUTURE CAMBODIA **IMPACT EVALUATION AND STRENGTHENING LOCAL CAPACITY** **TO MONITOR AND EVALUATE FOOD SECURITY PROGRAMS**

Final Report
September 29, 2012 – March 31, 2017



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MICHIGAN STATE
UNIVERSITY

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Final Report
September 29, 2012 – March 31, 2017

Prepared by

Michigan State University

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UNIVERSITY

Food Security III Leader with Associates CA No. GDG-A-02-00021
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Impact Evaluation and Strengthening Local Capacity to Monitor and Evaluate Food Security Programs

Introduction

The Food Security Group (FSG) at Michigan State University (MSU) submits this final report of Cambodia Associate Cooperative Agreement No. AID-442-LA-12-00001, which ran from September 29, 2012, through March 31, 2017. At the core of this award was the impact evaluation of the Feed the Future Cambodia HARVEST program and collaboration with local institutions such as the Cambodia Development Resource Institute (CDRI) and the Royal University of Agriculture (RUA) aimed at strengthening local capacity to monitor and evaluate food security programs in Cambodia.

This report summarizes major activities and accomplishments of the project. The work was completed in collaboration with local institutional partners. Consistent with project goals and objectives, all annual work plans were developed in consultation with USAID/Cambodia and approved by the designated AORs.

The team provided technical help to CDRI during the project's first year in finalizing the impact evaluation baseline report. As part of the project, the MSU team also worked closely with the Royal University of Agriculture (RUA) in implementing the local evaluation capacity building activities (Program Evaluation Short Course) which led to 87 Cambodian mid-career agriculture professionals benefitting from such training. MSU team members also led the development of national agricultural extension policy for Cambodia. Additionally, the MSU team conducted the evaluation of four case studies focusing on agricultural extension, aquaculture, the family nutrition program and the commercial horticulture program.

Impact Evaluation Baseline

The impact evaluation of Cambodia HARVEST was the first study among Feed the Future (FtF) initiatives. MSU team member Dr. Murari Suvedi travelled to Washington, D.C. to meet USAID personnel at the Bureau of Food Security to discuss issues related to the Cambodia FtF evaluation baseline and indicators reporting. He also met with the International Food Policy Research Institute (IFPRI) team in charge of the Women Empowerment in Agriculture Index (WEAI). These meetings were crucial to finalize the impact evaluation baseline survey questionnaire and cross-check on references and methods including the preparation of indicators and establish continued communication with the WEAI team.

In addition to finalizing the impact evaluation baseline questionnaire, the MSU team focused on interacting with CDRI and the USAID mission to: review and validate the baseline data collected by CDRI in the four provinces between September and November 2012; systematize and help generate FtF required indicators, and impact evaluation indicators; and guide CDRI in the conceptualization of the broader baseline report.

Note that the Cambodia HARVEST program had already contracted CDRI to conduct the baseline survey for impact evaluation prior to the MSU Team joining the program. The MSU team joined the effort by assisting in finalizing the survey questionnaire and provided technical assistance and guidance for field data collection. The MSU team members -- Dr. Rui Benfica, Dr. Mywish Maredia and Dr. Murari Suvedi -- have had multiple interactions with Dr. Vuthy of CDRI on baseline data collection and data analysis. Particularly, Dr. Rui Benfica provided an on-site hands-on training to CDRI staff members on data

cleaning and data analysis using STATA software. He assisted in computing the FtF required high-level indicators, HARVEST project PMPs, and impact evaluation indicators.

During May-July, 2013, CDRI shared multiple drafts of the baseline report with the MSU team. Dr. Benfica, Dr. Maredia, and Dr. Suvedi provided feedback on the draft report. CDRI incorporated the feedback, and the final baseline report was submitted in August 2013 (see Annex A).

The collaborative nature of the MSU team's interaction with CDRI resulted in substantial capacity building within CDRI. The MSU team was committed to pursue this hands-on approach to effectively pass on high levels of analytical capabilities to domestic institutions.

In addition to dealing with the baseline data and indicators, the team engaged in discussions with the USAID mission, CDRI, and Fintrac, Inc., regarding planning for future survey rounds. Initially, the idea had been to hold two additional survey rounds -- a midline and an endline survey. Agreement was reached that there would be only one more round of the survey, in 2015. Resources initially allocated to the midline survey were reallocated within the budget to other project activities.

National-level Evaluation Case Studies

The MSU project was designed to conduct one evaluation study each year of the project to demonstrate good evaluation practices on topics related to food security in Cambodia. Four such case studies were completed during the course of the project. The case studies were:

I. Agricultural Extension in Cambodia

This project provided for planning and conducting a case study to contribute to Feed the Future Cambodia's goals and objectives. The first case study was planned to assess the agricultural extension services in Cambodia. Dr. Murari Suvedi provided leadership for this study. Dr. Men Sarom of RUA coordinated the fieldwork for data collection. Nine teams of field data collectors, each team consisting of one team leader and eight RUA students, were organized and mobilized for field data collection. A total of 81 RUA faculty, staff and students (i.e., 72 students and 9 faculty/staff members) received training on field data collection methodology for this project. Mr. Tonh Mok, Evaluation Specialist at the USAID/Cambodia, offered guidance for field data collection. Dr. Men Sarom and RUA staff arranged for the translation of the survey instrument for farmers and the interview schedule for extension professionals and key informants to the Khmer language, assembled the survey instruments, prepared survey and token gift packets for each province, and coordinated transportation arrangements for each team of data collectors.

Data were gathered from 3,072 farmers and 143 key informants during May thru June 2013. The MSU team developed the SPSS codebook and data entry plan. The team leaders completed data entry into SPSS. A preliminary report with PowerPoint slides was shared with AORs in September 2013. The final report was completed in December 2013 (see Annex C for MSU faculty-led case study reports).

To maximize the utilization of case study findings, the mission suggested sharing the results with national-level program managers and policymakers. Accordingly, a National Workshop on Demand-Driven, Participatory, and Pluralistic Agricultural Extension Services was planned and took place on February 11, 2014. MSU team member Dr. Suvedi developed a major presentation based on findings of this national case study on agricultural extension and discussed its implications. Participants at the national workshop included:

H.E. So Khan Rythikun	Director General, General Department of Agriculture (GDA)	kunso@camnet.com.kh
H.E. Ngo Bunthan	Rector, Royal University of Agriculture (RUA)	bunthan_rua@camnet.com.kh
Dr. William Bradley	USAID/Cambodia	wbradley@usaid.org
Dr. Men Sarom	Vice rector, RUA	msarom55@gmail.com
Dr. Seng Mom	Vice rector, RUA	mseng@rua.edu.kh
Dr. Huon Thavrak	Deputy director/RUA	huonth@hotmail.com
Dr. Cheang Hong	Deputy director/RUA	chhong2012@yahoo.com
Dr. Kim Sreong	Director of MRD	kimsreongb@gmail.com
Dr. Mak Soeun	Director of DAE	mak_soeun@camnet.com.kh
Mr. Sameng Keo Monine	Deputy director of DAE	skeomonine@online.com.kh
Mr. Say Tom	Human Resource Development, DAE	saytom18@yahoo.com
Mr. Kong Samoeun	GDA	samoeunkong@yahoo.com
Dr. Chan Saeuth	Director, Dept. of Agricultural Machinery	saruthchan@hotmail.com
Say Somlot	Dept. of Agricultural Engineering	saysamlot@yahoo.com
Douch Som Oun		samonduch@ymail.com
Dr. Nil Sothon	Chief, Technical and Extension, DRD	nilsothon@gmail.com
Mak Chankakada	Officer of DDA	
Krouch Sophak		sophak.krouch@yahoo.com
Nup Sothea	Forestry Administration	nupsothea67@yahoo.com
Dr. Ok Saven	DAHP	savinok4@gmail.com
Mr. Kea Pha	DAHP	
Ms. Em Pheakdey	Research Director, Nuppun Institute for Economic Research	empheakdey@nuppun.org
Lam Saoleng	Program Coordinator, National Biodigester Program	saoleng@nbp.org.kh
Mr. Phuong Dara	National Biodigester Program	dara@nbp.org.kh
Mr. Prak Sereyvath	Director	prakereyvath@online.com.kh
Chom Chhai ya	Economic Institute of Cambodia	
Nhean Chouch	MAFF	nheanchoch@gmail.com
Sambath Sak	USAID/Cambodia	ssak@usaid.gov
Oum Kosal	FAO/Cambodia	kosal.oum@fao.org
Sim Samoeun	CEDAC/Cambodia	simsm@cedac.org.kh
Chan Sophal	Cambodian HARVEST	schan@fintrac.com
Chea Eliyan	RUPP-Cambodia	chea_eliyan@yahoo.com
Srey Chanthly	Freelance Analyst	sreychanthy@gmail.com
Ngov Chansreyroat	RUA	ncsreyroat@rua.edu.kh
Ly Yann Kouv	Regional Coordinator	lkanv@oxfarmamerica.org
Bun Chhun	GDA	bunchhun@gmail.com
Chhuon Soklang	SNV	schhuon@snvworld.org
Siv Cheang	JICA	shivcheang.cw@jica.go.jp
Rui Benfica	MSU Food Security Group	benficar@anr.msu.edu
Srun Sokhom	GDA	srun.sokhom@yahoo.com
Lim Sovannara	Cambodia HARVEST	slim@fintrac.com

Leu Kim Heng	Kampong Cham School of Agriculture	leu_kimheng@yahoo.com
Goele Drijkoningen	SNV	gdrijkoningen@snvworld.org
Fredelik Sagemueller	Hort CRSP/RUA	frederik.sagemuller@gmail.com
Ann Kimheng	Cambodia HARVEST	akimheng@fintrac.com
Pin Tara	Chea Siem Univ. of Kam Chay Mear	pintara30@gmail.com
Cakunthearosnhum Sov	Mean Chey University	sothearos@yahoo.com
Kang Tithya	Svay Rieng University	kang_tithya@yahoo.com
Sip Pagnaosoley	University of Battambang	soley90@hotmail.com
Cheu Ponleu	Cambodia HARVEST	pcheu@fintrac.com

II. Qualitative Evaluation of the Family Nutrition Education Program

Dr. Kimberly Chung visited Cambodia at the end of 2014 to finalize the case study related to nutrition and agriculture. She developed the case study on child feeding practices within HARVEST project areas. She identified and trained staff persons to assist her in the fieldwork. The case study documents the strengths and areas needing improvements in child feeding practices (see evaluation case study report in Annex C).

III. Cambodia HARVEST Aquaculture Program Evaluation

Dr. Robby Richardson, Dr. Michael Kaplowitz, and Dr. Murari Suvedi, all part of MSU Team worked together to evaluate the aquaculture program under the Cambodia/HARVEST project. The evaluation report is included in Annex C.

IV. Commercial Horticulture Program Evaluation

In response to a request from the AORs, the fourth evaluation case study was focused on the commercial horticulture program of Cambodia/HARVEST. Dr. Suvedi worked with a team of Cambodian mid-career professionals who had participated in the project's short course on program evaluation in order to conduct field data collection on the horticultural program. Cambodia-based staff members supervised the data collection and completed the data entry and data cleaning. Further data cleaning, data analysis and interpretation, and report writing was completed at Michigan State University, the final case study report on commercial horticulture was completed by a team of researchers led by Dr. Suvedi (see Annex C for the report).

Presentation of case study findings during the Feed the Future Cambodia Conference

The MSU team, led by Dr. Suvedi, made four presentations of the evaluation case studies conducted during 2013-2016 (the four years of the project) at the Feed the Future Conference in June 2016. The presentations were:

- Strengthening Agricultural Extension Services in Cambodia.
- Evaluation of Cambodia HARVEST Aquaculture Program.
- Qualitative Evaluation of the Family Nutrition Education Program.
- Commercial Horticulture Survey Findings.

Agricultural Extension Policy

The agricultural extension case study conducted during the first year led to the development of an agricultural extension policy by the Ministry of Agriculture, Forestry and Fisheries. As a result, the Royal

Government of Cambodia requested USAID/Cambodia to provide technical assistance, and Dr. Suvedi was asked to provide technical advice on extension policy development. He assisted the Cambodian government to develop its agricultural extension policy. USAID/Cambodia requested Dr. Suvedi to provide technical leadership, in cooperation with Cambodia HARVEST to enable the General Directorate of Agriculture of the Ministry of Agriculture Forestry and Fisheries in extension policy development. Dr. Suvedi devoted significant time to working with the Cambodian Core Team for Policy Formulation to organize regional and national listening workshops for policy feedback, plan an international study tour for core team members, and draft the policy document.

The core team members included key officials of MAFF and national-level stakeholders, and the development of the policy document followed a truly participatory process.

The policy document was developed after extensive consultation with stakeholders. The new policy was launched by the Honorable Minister of Agriculture, Forestry and Fisheries on May 28, 2015. An English version of the extension policy document is presented in Annex B.

Members of the Agricultural Extension Policy Formulation Team (Dr. Mak Soeun, deputy director general of GDA of MAFF and Dr. Mao Minea, director of the Department of Agricultural Extension) and Dr. Suvedi shared the process followed for the development of new extension policy with an international audience at the USAID/MEAS Symposium in June 2015 in Washington, D.C.

Strengthening of Local Capacity to Monitor and Evaluate Food Security Programs

I. Degree Training for Cambodian Nationals

A limited number of scholarships were planned to be awarded to qualified Cambodian citizens to pursue graduate study in the United States or within the Southeast Asia region including Cambodia. Working closely with the [USAID mission](#) and local partners, this project identified and short-listed candidates for degree training. The following candidates were recommended for degree training starting in fall of 2013:

- Mr. Tum Nhim – Master’s degree in the Department of Community Sustainability, MSU — completed degree and returned to Cambodia.
- Ms. Thany Hour – Ph.D. in Department of Community Sustainability— completed M.S. degree and returned to Cambodia.
- Mr. Kim Eang Tho – Ph.D. in Department of Plant, Soil, and Microbial Sciences, MSU —currently doing fieldwork in Cambodia.
- Mr. Keo Socheat – Ph.D. in the Department of Community Sustainability -- currently doing fieldwork in Cambodia.

The funding for the above four degree trainings in the United States was provided through the USAID/BHEARD project. MSU team member Dr. Suvedi and Dr. Eric Crawford served as PIs for this capacity-building grant to manage the long-term degree training.

MSU Food Security III Associate Award had planned two master’s degree trainings for Cambodian nationals. A call for master’s degree fellowship applicants was made in the Cambodia Daily and on a local blog -- Bongthom.Com -- and over 18 applications were received. Two candidates (i.e., Mr. Botum Horn and Mr. Maneth La) were selected for master’s degree training at Michigan State University. Both candidates successfully completed their degrees returned to Cambodia.

Two candidates were also recommended for master's degree training at the Royal University of Agriculture through funding from this project:

- Ms. Ngov Chhansreyroat completed her master's degree at RUA.
- Ms. Eng Sotheath was selected for the degree training fellowship but dropped out of the degree program at RUA to accept an EU fellowship. As replacement, Ms. Hor Sourlong was selected to receive the remaining fellowship funding to complete her master's degree in natural resources management at RUA.

II. Short Courses on Program Evaluation for Mid-career Professionals

The MSU Associate Award included plans to strengthen evaluation capacity by offering a program evaluation short course to 20 mid-career Cambodian professionals each year for four years.

During the first year of this project (2013), 26 mid-career professionals were selected to receive training in program evaluation. On January 17, 2013, Dr. Kimberly Lucas from USAID/Cambodia inaugurated the first training at the Royal University of Agriculture.

The first weeklong session was held January 17-22, 2013. The second week-long training was planned for June 18-23, 2013. Eight teams of two to three participants planned an evaluation case study and completed data collection between sessions. During the second session, they learned about data analysis. By September 2013, four teams had completed the writing of the evaluation report and other teams were working on report writing. The following participants attended in the first year:

An Moy Ngech	Prek Leap National School of Agriculture	Vice chief of laboratory
Bun Chan	National Veterinary Institute	Deputy director
Bunthong Borarin	Royal University of Agriculture	Lecturer
Chem Sochheary	AID	Coordination officer
Chhim Chhun	Cambodia Development Resources Institute (CDRI)	Program assistant
Chhith Chanlyda	RUA	Government staff member
Chhoeurn Sarin	Ministry of Tourism	Pro-poor and community-based tourism official
Hay Thoura	PDA, Purasat	Vice chief of Agricultural Extension Office
Keo Socheat	CDRI	Research associate
Kong Vouchsim	Ministry of Agriculture, Forestry, and Fisheries	Staff of Department of Agro-Industry
Lim Sophornthida	CARDI	Research assistant at Socio-Economics
Long Solida	Royal University of Phnom Penh	Lecturer
Lor Lytour	Royal University of Agriculture	Vice dean of Graduate School
Men Pagnchak Roat	CARDI	Research assistant, Socio-Economics Division
Nhem Vorlak	AID	Coordination officer
Pen Satyavisal	Royal University of Phnom Penh	Lecturer
Sovath Seyla	Ministry of Environment	Deputy chief of Bureau of International Affairs
Thavrak Huon	Royal University of Agriculture	Acting dean of Graduate School,
Thoeurn Sarkmarkna	Ministry of Woman's Affairs	Deputy director of Economic Department

Vith vika	Ministry of Woman's Affairs	Assistant to the Minister, Council of Minister
Yi Bunha	Ministry of Agriculture, Forestry, and Fisheries	Chief of Agro-Industrial Development Office
Rithy Longdy	MRD	M&E officer
Mob Serey	RUA	Research officer
Tho Kim Eng	RUA	Lecturer
Ponh Oudam	Department of POA-BTB	Deputy director
Ith Kallyan	Cambodia HARVEST (Fintrac)	Monitoring and evaluation manager

Each year, teams of two to four participants planned an evaluation case study and completed data collection between sessions. During the second session, they learned about data analysis. MSU faculty members guided the data analysis and report writing. By September of each year, teams completed the writing of the evaluation reports. Selected team evaluation projects completed by Short Course participants have been compiled (see Annex D).

Starting in the second year, MSU team members Dr. Suvedi and Dr. Michael Kaplowitz worked closely with Tonh Mok, evaluation specialist with USAID/Cambodia, to recruit participants for the training. The mission extended invitations to four Provincial Department of Agriculture offices (Pursat, Battambang, Siem Reap, and Kampong Thom) representing the HARVEST project areas to nominate candidates for the short course. The invitations were also extended to select national-level NGOs that collaborate with development partners. We received 21 nominations from the PDAs and NGOs, of which the following 19 participants decided to participate in the short course:

Ms. Khiev Pirom	Phnom Penh	Research associate	CDRI - Cambodia Development Resources Institute
Mr. Srey Vireak	Phnom Penh	Research assistant	CDRI - Cambodia Development Resources Institute
Mr. Mao Vannak	Phnom Penh	Program officer	CIRD - Cambodian Institute for Research and Development
Mr. SRENG Bora,	Phnom Penh	Member	IGC - InterGreen Cambodia
Mr. Tong Socheat	Phnom Penh	Member	IGC - InterGreen Cambodia
Ms. Pheakdey EM	Phnom Penh	Staff	NIER - Nuppun Institute for Economic Research
Mr In Sovanmony	Battambang	Chief, Agronomy	PDA - Battambang Provincial Department of Agriculture
Mr. Seang Tharath	Battambang	Staff	PDA - Battambang Provincial Department of Agriculture
Mr. Pov Kol	Kompong Thom	Staff	PDA - Kompong Thom Provincial Department of Agriculture
Mr. Chaun Khet	Kompong Thom	Staff	PDA - Kompong Thom Provincial Department of Agriculture
Mr. Ouk Sothea	Pursat	Staff	PDA - Pursat Provincial Department of Agriculture
Ms. Suong Kanha	Pursat	Staff	PDA - Pursat Provincial Department of Agriculture
Mr. Yang Bunthim	Siem Reap	Staff	PDA - Siem Reap Provincial Department of Agriculture
Ms. Moeun Sophoan	Siem Reap	Staff	PDA - Siem Reap Provincial Department of Agriculture
Mr. Hor Saray	Phnom Penh	Staff	SBK - Research and Development
Mr. Pinn Thira	RUA	Lecturer	Royal University of Agriculture
Ms. Chea Eliyan	RUPP	Env. Science	Royal University of Phnom Penh

Mr. Nou Vuthy	CARDI	Planning	Cambodian Agriculture Research and Development Institute
Dr. Sok Serey	RUPP	Lecturer	Royal University of Phnom Penh

Ay Satya	satya_ay@yahoo.com	Food Security/Nutrition Program officer	FINTRAC
CHAO Sinh	chaosinh@gmail.com	Vice chief of Postharvest Technology Office	MAFF -- Department of Agricultural Engineering
CHEA PHALA	cheaphala76@yahoo.com	Chief of Genetic and Diseases	Marine Fisheries Research and Development Center
Cheav Samphy	cheavsamphy@gmail.com	Data quality audit and research coordinator	FHI 360
Chen Dechorith	dechorith@yahoo.com	Program officer	WRC -- World Renew Cambodia
Han Senghour	nassenghour@yahoo.com	Deputy director	NAS -- Nak Akphivath Sahakum
Khong Sophoan	sophoan@cadf-angkor.info	CADF-CODES project manager	iDE Cambodia -- International Development Enterprise Cambodia
Lao Thoeung	lao.thoeung@malteser-international.org	Food Security manager	Malteser International
LYDA HOK	hoklyda@rua.edu.kh	Instructor	RUA -- Royal University of Agriculture
MEAS SOMICA	meassomica@gmail.com	Agriculture advisor (irrigation O&M specialist)	CAVAC -- Cambodian Agriculture Value Chain Program
NHA BUNNET	bunnet_nha@yahoo.com	Research assistant	RUA -- Center for Livestock Development
OR THY	orthy.smt@gmail.com; or.thy@iirr.org	Country manager	IIRR -- International Institute of Rural Reconstruction
RAT Rotana	rotana@cird.org.kh	Technical adviser in agriculture	CIRD -- Cambodian Institute for Rural Development
Samonn MITH	s.mith@cgiar.org	M&E national coordinator	World Fish
Seila SAR	seila.sar@hotmail.com	Quantitative specialist	The Asia Foundation
SOEU SOUSDEY	sousdeysoeu_chmo111@yahoo.com	Field monitor assistant	WFP -- World Food Program
Srey Tethvoleak	tethvoleaksrey@yahoo.com	Gov't official	PDA -- Provincial Department of Agriculture
TEK SOPHATH	sophath983@gmail.com	Zonal DME officer	World Vision Cambodia
TEY Sarin	teysarin@gmail.com	General Directorate of Agriculture	GDA-MAFF-Food Security Strategy Development and Agriculture, GDA
Tho Thida	thidathos@gmail.com	Food Security and Nutrition Program officer	FINTRAC

Uch Sophâs	sophas_uch@yahoo.com	Land management advisor	GIZ
YIP THAVRIN	ythavrin@gmail.com	Deputy director	National Institute of Statistics

During the third year, the call for applications for the short course on program evaluation was announced in the Cambodia Daily national newspaper and Bomthom.com. This year, more than 80 applications were received. A participant selection committee was formed to review and select from applications received by the due date. The committee members were requested to rate the applications using the following criteria:

- Academic preparation in area of agriculture, food security and nutrition.
- Mid-career professional -- i.e., 5-10 years of relevant work experience.
- English language proficiency.
- Diversity (gender), organization (government or NGO), geographic representation.
- Potential for contribution to agriculture, food security, and nutrition program/policy evaluation in Cambodia.

The following individuals were selected to participate in the short course in 2015:

In year 4, the call for application for short course on program evaluation was announced in the Cambodia Daily national newspaper in December. The announcement was also shared with short course participants from previous years. This time, we received 63 applications from mid-career professionals. We formed a five-member committee to review and rate applications. Twenty-one individuals were selected to participate in the short course in 2016:

Name	Current Position	Organization
CHEA Seila	Research analyst	World Fish
EANG Sovannara	Monitoring and evaluation officer	Wathnakteap
HENG Kun	Coordination and learning unit national coordinator	Partnering to Save Lives (PSL)
HOK Leanghak	Instructor	Prek Leap National College of Agriculture
HORL Long	Food security and nutrition specialist	Cambodia HARVEST
HUN THIDA	National curriculum development consultant	Food and Agriculture Organization
KONG Sothea	Agro-industry officer	Provincial Department of Agriculture, Kampot
Leang Chenda	Monitoring and evaluation officer	Farmer Livelihood Development
Ly Seyha	Acting Chief, Aquaculture Technology Feed and Water Quality	
MATH Srales	Monitoring and evaluation specialist	Save the Children
Men Chanbona	Monitoring and evaluation/GIS manager	International Development Enterprises
NAM Sokunthy	Research officer	University of Battambang
NARA Noualyny	Postharvest handling and marketing officer	Cambodian Institute for Research and Rural Development
SAM CHANTHY	Research team leader	National Institute of Social Affairs
San Putthy	National design, monitoring, and evaluation officer	World Vision Cambodia
Sip Pagnasoley	Vice rector	University of Battambang
SOK Kao	Program officer	World Renew in Cambodia
SOK Neng	Design, monitoring, and evaluation officer	World Vision Cambodia
SOM Sitha	Species conservation and monitoring advisor	Wildlife Conservation Society

SREY Sinath	Lecturer	Angkorkhemara University
YIM Samnang	DRR and resilience advisor and emergency coordinator	CARE International in Cambodia

Partnership with RUA and CDRI

From the beginning, the MSU project collaborated with the Royal University of Agriculture (RUA) and Cambodia Development Research Institute (CDRI). These partnerships have resulted in major institutional impacts strengthening local capacity in evaluation. The RUA collaborated in offering program evaluation short courses for four years. Its faculty and graduate students benefitted from the degree training and short course training programs. Over 80 students participated in field data collection for various evaluation case studies.

The CDRI has been a key partner on this project. In 2012, CDRI completed the baseline study for impact evaluation under a separate arrangement through the USAID HARVEST project, and MSU provided technical guidance. Dr. Suvedi and Dr. Maredia met with Dr. Theng Vuthy and his team at CDRI on September 10, 2015, to discuss the plans for the endline data collection for impact evaluation. MSU finalized the scope of work and budget for the endline evaluation, and a subcontract with CDRI to collect the endline impact evaluation of Cambodia HARVEST and complete data entry and data cleaning work was finalized. CDRI started preparation for field data collection in July 2016. Field data collection was completed in September. Double data entry was completed.

Impact Evaluation Endline Survey and Report

During annual work plan development and consequent discussions with the AORs, it was decided that endline survey data be collected at the same season/timing of baseline data collection. This necessitated some delay in endline data collection, so a request for no-cost extension was made. The no-cost extension request was approved for six months. Accordingly, endline data were collected during the same season of the year (August-September, 2016) by the same organization (CDRI, Cambodia). The impact evaluation report is included as Annex E. The main highlights of this Report are summarized below.

I. Background

The Cambodia Helping Address Rural Vulnerabilities and Ecosystem Stability (Cambodia HARVEST) project was a five-year (December 2010-June 2016) USAID Feed the Future (FtF) initiative implemented in selected districts across four provinces of Cambodia – Battambang, Pursat, Siem Reap, and Kampong Thom. HARVEST program interventions focused on increasing incomes to influence nutrition outcomes. This was achieved through an approach that integrated activities from a range of sectors—agriculture, fisheries, forestry, nutrition and more—to help families in rural areas grow, purchase, and prepare more nutritious foods. Cambodia HARVEST was rolled out in phases over the 5 1/2-year period, which ended in June 2016. Over that time, the project’s strategy evolved as activities were scaled up, but the overall approach remained guided by the principles of linking agriculture and nutrition to achieve some of the overarching development goals of reducing poverty and malnutrition.

To assess whether this approach of linking agriculture and nutrition through a comprehensive development project such as Cambodia HARVEST is effective, USAID/Cambodia funded Michigan State University (MSU) to conduct an independent and rigorous impact evaluation of the Cambodia HARVEST

as part of its overall FtF monitoring and evaluation strategy. To this effect, baseline and endline data were collected in 2012 and 2016, respectively. This report presents the results of the endline survey conducted in HARVEST-targeted villages to assess whether and by how much project outcome status of some key FtF indicators along the impact pathway improved for Cambodia HARVEST clients compared with the baseline. It also presents the results of the impact evaluation of project interventions using rigorous methodologies that take into account counterfactuals and selection bias issues to assess whether the observed changes in outcome status of client households can be attributed to Cambodia HARVEST.

II. Evaluation Design, Data, and Methodology

The request to design an impact evaluation of Cambodia HARVEST was made to MSU after the project had already selected and initiated interventions in some villages but before it identified all the project villages and beneficiaries to be targeted over the five-year period. This obviated an impact evaluation strategy based on a randomized controlled trial. The only rigorous method that was available to address the program placement bias and farmer self-selection bias to assess causal effects was the difference-in-difference (DiD) approach combined with propensity score matching (PSM), which we used for this evaluation. This quasi-experimental approach sample 1 involved collecting baseline and endline data from a sample of farmers from villages designated as the treatment group, and from villages designated as the comparison group. The propensity score matching method was applied to the baseline data first to create treatment and comparison groups that matched on propensity score. This was followed by estimating the average effect of HARVEST interventions across all the sampled households that had received direct technical assistance from Cambodia HARVEST compared with the effects across all the sampled households in the comparison villages.

Baseline data were collected in 2012 from 1500 farm households representing 60 Cambodia HARVEST villages and 600 households representing 24 comparison villages that were projected not to receive any Cambodia HARVEST intervention. The average distance between the comparison village and the nearest treatment village included in the sample was about 4 km. In 2016, the same 2100 households were revisited to complete an endline survey. Attrition of 179 households reduced the total number of reinterviewed households from 2100 to 1921. The 1500 treatment households surveyed in 2012 were selected from a list of households provided by Cambodia HARVEST that were targeted to receive interventions in 2012 or 2013. However, 127 households resurveyed in 2016 were found to have not participated as clients, and another 185 did not “graduate” from the program as planned. To evaluate the effects that the project had on the client beneficiaries, we used only those households that actually participated in Cambodia HARVEST as clients. We thus used two analytical samples to estimate the program effects. Sample 1 includes only client households that were active or had graduated from Cambodia HARVEST and are considered the true treatment sample (1088 households). Sample 2 includes all client households, irrespective of whether they graduated or dropped out of the program (1273 households). PSM-DiD estimates based on sample 1 measure the average treatment effect on the treated (ATT), and those based on sample 2 measure the intent to treat treatment (ITT) effects.

III. Descriptive Analysis Results

The 2016 survey data indicate that about 60% of households in both the treatment and comparison groups had participated in at least one activity/intervention organized by government or other NGOs in the previous four years. This reflects potential contamination of project interventions in comparison villages that could bias the results of impact evaluation.

The descriptive analysis points to the project's success in influencing the general awareness and knowledge about concepts, terminologies, and practices promoted by the project. The women in the treatment group also reported having a higher level of knowledge about some of the food consumption practices for children and adults, the concept of three food groups, and practices related to good hygiene than women in the comparison group.

Beyond awareness and knowledge, the respondents in Cambodia HARVEST intervention villages also reported a high prevalence of uptake and adoption of good agricultural production and nutrition practices promoted by the project. Also, a significantly higher percentage of farmers in treatment villages than farmers in comparison villages reported having adopted some of the improved technologies and practices promoted by the project for rice, such as direct sowing of rice, row planting, and short-duration rice varieties, and for vegetables, such as raised planting beds, the use of mulch, drip irrigation, trellis netting, and nurseries. A significantly higher percentage of treatment farmers reported having tried a wide range of new techniques for both rice and vegetables over the previous four years. However, consistent with evidence elsewhere, there remains a substantial gap between awareness and uptake, and between uptake and current adoption of improved technologies. For instance, only 50% of farmers who became aware of a new technology had tried it or taken it up, and only 50% of those that had tried it continued to use the technology when interviewed in 2016.

Beyond adoption and uptake of improved practices, the results of descriptive analysis also indicate that, on indicators of productivity, crop income, expenditures, poverty, hunger, dietary diversity, and indicators of malnutrition, sampled households from the Cambodia HARVEST-targeted villages saw a significant improvement from the levels observed in 2012 (start of the project) to 2016 (end of the project). For example, among the villages targeted for Cambodia HARVEST interventions, the poverty rate significantly decreased from 12% to 4% during that four-year period. Annual per capita expenditure on food and non-food items (excluding housing) increased from US\$547 in 2012 to US\$609 in 2016 among treatment households. The prevalence of stunting, wasting, and underweight among children younger than 5 was, respectively, in the range of 30%, 10%, and 20% among the treatment group in 2016, which was a reduction from the observed rates (45%, 10%, and 30%, respectively) in 2012. A key finding of this study is that similar improvements in these indicators were also observed in non-treatment villages. The fact that there were other donor and government programs active in the comparison villages could be a plausible explanation of this outcome.

IV. Results of Impact Analysis

We present results of impact analyses based on the PSM-DiD approach using two analytical samples to estimate the average treatment effect on the treated (sample 1) and the intent-to-treat treatment effect (sample 2). For a further robustness check, we estimated the program effect using both correlated random effects and household fixed-effect models.

The analysis failed to detect statistically significant and robust impacts of Cambodia HARVEST. In other words, comparing the before and after intervention data between the treatment and comparison villages and controlling for potential confounding factors showed no statistically significant effect of the program in changing the average values of these key indicators.

The only indicators for which the program shows a significant effect in one of the models—some positive and some negative—are the prevalence of wasting and underweight among children younger

than 5 years, and rice yield per household. Results of the correlated random effect (CRE) model indicate the program contributed to about a 9% reduction in wasted children (in both sample 1 and sample 2). On the other hand, the program effect is opposite for underweight children. It is estimated that the program increased the proportion of underweight children by about 9% (only in sample 2). Both these positive and negative effects on child nutrition observed under CRE model are not sustained, however, when we used the household fixed-effects model. For rice, the results indicate a 0.12 t/ha reduction in yield for sample 2, but only in the FE model. Most of these negative effects are associated with male-headed households (-0.17 t/ha) and in Pursat province (-0.30 t/ha). In terms of differential program effects by gender or location, there are few statistically significant robust effects. One such effect of the HARVEST program is the positive effect of increasing the value of vegetable production for female-headed households by 0.16 million Riels.

The report discusses several potential reasons for the overall inconclusive results of the impact analysis, including: the reduced sample size, which lowered the statistical power to detect treatment effects; non-conformity of treatment households, which lowered the intensity of treatment and significantly reduced the sample size of the treatment group; contamination of the control group from the presence of other similar programs and potential spillover effects of Cambodia HARVEST; the service delivery approach taken by Cambodia HARVEST that included intensive technical assistance to clients for 18-24 months but no contact with extension service providers after that to reinforce the messages and techniques extended by the project; and the possibility that the impacts are still not realized, and this evaluation may have taken place too soon.

V. Conclusions

The main findings of this study are that, on all counts of productivity, crop income, expenditures, poverty, hunger, dietary diversity, and indicators of malnutrition, Cambodia HARVEST client households saw a significant improvement from the levels observed in 2012 (baseline) to 2016 (endline). The non-project beneficiaries also saw similar levels of improvements, however, perhaps due to the presence of other donor and government programs or because of spillover effects of Cambodia HARVEST due to the close proximity of treatment and comparison villages. The PSM-DiD-based impact analysis thus failed to detect any statistically significant program effect on the treated or intended-to-treat households. Because of these confounding factors -- i.e., presence of other donors and government programs in the study area, and potential contamination from close proximity of treatment and comparison villages -- this study cannot arrive at any conclusions about the relative effectiveness of Cambodia HARVEST, other donor programs, or no interventions.

Rigorous impact evaluation can yield strong evidence of the causal effects of a program. But this method is not practical in all settings. We hope that the issues and challenges identified in this study will provide some guidance on the appropriateness of rigorous impact evaluations of such large-scale comprehensive development projects in future.

Epilogue

Overall, our project got off to a good start in the implementation of the various components. The keys to this success were the firm commitment and full support of the USAID mission at all levels and the interest, collaboration, openness, and commitment of the local institutions involved in the project. The MSU team truly appreciates the strong support and cooperation extended by the mission.